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FM 6-20

DEPARTMENT OF THE ARMY FIELD MANUAL

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ARTILLERY

TACTICS

AND

TECHNIQUE



DEPARTMENT OF THE ARMY

• OCTOBER 1953

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UNCLASSIFIED

FIELD MANUAL

ARTILLERY TACTICS AND TECHNIQUE

FM 6-20
CHANGES No. 1}DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 5 May 1955

FM 6-20, October 1953, is changed as follows:

204. General

* * * * *

b. The suggested form * * * analyzing all targets. When it appears after such a brief analysis, that a target may be suitable for attack by atomic means, the G3 of the supported force, who is responsible for making the detailed target analysis for mass destruction weapons, will be immediately notified. The specific target * * * the following paragraphs.

205. Plan of the Supported Unit

* * * * *

b. Because of the * * * of atomic weapons. This decision is based on the detailed target analysis made by the G3.

* * * * *

208. Determination of Suitable Available Weapons

a. General. The characteristics of * * * artillery intelligence representative. In the employment of atomic means the commander will decide the type of weapon to be employed to deliver the atomic strike.

* * * * *

222. Atomic Fire Power

a. General. Atomic fire power produces tremendous effect. The general staff (G3) in conjunction with the fire support coordinator advises the commander on the employment of atomic fire power. Artillery commanders and * * * in TM 23-200.

* * * * *

c. Atomic Fire Support Plan. The G3 forms the basis for the atomic fire support plan. This plan is prepared in the FSCC at division, corps, and army levels, in accordance with the decision of the commander and in conjunction with planning for the employment of other fire-support means. The magnitude of the destructive effect of atomic fire power, however, introduces factors in addition to those considered in planning nonatomic fires.

* * * * *

(8) Recommendations of the G3 concerning atomic attack are presented to the commander for decision. This presentation, in the form of a detailed target analysis, is made by the G3.

* * * * *

243. Functions

* * * * *

b. Functions as the * * * and target analysis (The G3 section functions as the focal point for detailed target analysis of atomic (CBR) targets).

[AG 853 (17 Feb 55)]

BY ORDER OF THE SECRETARY OF THE ARMY:

M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

OFFICIAL:

JOHN A. KLEIN,
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MDW (1)	Ft & Cp (1)	ARMA (1)
Armies (5)	USMA (50)	

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.

USAR: Same as Active Army except allowance is one copy to each unit.
For explanation of abbreviations used, see SR 320-50-1.

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*FM 6-20

FIELD MANUAL
No. 6-20

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 22 October 1953

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TACTICS AND TECHNIQUE

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*This manual supersedes FM 6-20, 26 May 1948, and FM 6-130, 3 June 1948, including C1, 14 June 1952.

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CHAPTER 1

GENERAL

1. Purpose and Scope

This manual is a guide for artillery officers and artillery commanders and their staffs and commanders of other combat arms *at echelons above battalion*. It is principally concerned with the tactical employment of artillery in the combat zone. The employment of antiaircraft artillery in the communications zone and the zone of the interior is excluded. It covers organization, command, and tactical control of artillery. It includes a discussion of the techniques involved in target acquisition, artillery fire planning, and the direction of artillery fires. It includes a general discussion of the principles, organization, and techniques of fire support coordination with particular emphasis given to artillery aspects. The employment of artillery in airborne, amphibious, and other special operations is covered. For employment of the field artillery battalion refer to FM 6-101; for employment of the field artillery battery FM 6-140; for field artillery gunnery FM 6-40. For a complete understanding of antiaircraft artillery matters, reference must be made to such manuals as FM 44-1, antiaircraft artillery employment; FM 44-2, organization and employment of antiaircraft artillery automatic weapons; FM 44-4, organization and employment of antiaircraft artillery guns; and FM 44-8, antiaircraft operations center and anti-aircraft artillery information service. For additional references see appendix I.

2. Classification

Artillery weapons are classified according to caliber and weight, and their method of organic transport.

a. Field artillery cannon are classified according to caliber and weight as light, medium, heavy, and very heavy. Self-propelled versions are given the same classification as their towed counterparts.

- (1) Light—under 115-mm, the weight of which in the trailed mount does not exceed approximately 7,000 pounds.
- (2) Medium—usually 115-mm or larger, the weight of which in the trailed mount is greater than approximately 7,000 pounds but does not exceed approximately 18,000 pounds.

- (3) Heavy—usually 155-mm and larger, the weight of which in the trailed mount is greater than approximately 18,000 pounds but does not exceed approximately 50,000 pounds.
- (4) Very heavy—usually larger than 200-mm, the weight of which in a trailed mount is greater than approximately 50,000 pounds.

b. Antiaircraft artillery cannon and weapons are classified according to caliber and weight as light, medium, and heavy. Self-propelled versions are rated in the same category as their trailed counterparts.

- (1) Light—usually under 90-mm, the weight of which in a trailed mount, including on-carriage fire control, does not exceed 20,000 pounds.
- (2) Medium—90-mm or larger, the weight of which in a trailed mount, excluding on-carriage fire control, does not exceed 40,000 pounds.
- (3) Heavy—larger than 90-mm, the weight of which in a trailed mount is greater than 40,000 pounds.

c. Artillery rockets are classified as free rockets and guided missiles.

- (1) Free rockets are classified as space saturation, antiaircraft artillery type and area saturation, field artillery type. Also as to caliber as light, medium, heavy and very heavy.
- (2) Artillery guided missiles are classified as field artillery guided missiles (FA GM) (surface-to-surface) and antiaircraft artillery guided missiles (AA GM) (surface-to-air).

d. Artillery weapons are classified according to their organic transport as towed, self-propelled, and pack.

- (1) Towed—artillery weapons designed for movement as trailed loads behind prime movers. This includes weapons transported in multiple loads, and weapons transported in a single load by multiple prime movers. Towed artillery is classified as truck drawn and tractor drawn according to prime mover.
- (2) Self-propelled—artillery weapons permanently installed on vehicles which provide motive power. The weapons are fired from the vehicle. Self-propelled artillery may be either armored or unarmored.
- (3) Pack—artillery weapons designed for transport in sections by animals. The weapon and carriage are partially disassembled for transport and reassembled for firing from ground positions.

3. General Missions

The two general types of artillery are field artillery (FA) and antiaircraft artillery (AAA).

a. Field artillery has two principal missions in combat:

- (1) It supports the other arms by fire, neutralizing or destroying those targets which are most dangerous to the supporting arms.
- (2) It gives depth to combat and isolates the battlefield by counterfire, by fire on hostile reserves, by restricting movement in rear areas, and by disrupting hostile command facilities and other installations.

b. The mission of antiaircraft artillery is to attack and destroy hostile targets in the air, on the ground, and on the water. This mission is logically divided into an air defense mission and a surface mission. Commanders whose force includes antiaircraft artillery assign it that mission, air defense or surface, dictated by consideration of the greatest threat to the accomplishment of the overall mission of the force. Whenever possible, without prejudice to the assigned mission, AAA will be sited so as to facilitate the performance of other missions.

- (1) The air defense mission is to attack all forms of enemy aircraft and guided missiles, to destroy them, to nullify or reduce their effectiveness, or to force them to abandon their hostile mission.
- (2) The surface mission is to support the other arms by fire: by neutralizing or destroying targets that are most dangerous to the supported arms; by providing or reinforcing field artillery fires; and by attacking and destroying targets of opportunity on land or on water.

CHAPTER 2

GENERAL CHARACTERISTICS OF ARTILLERY

4. Capabilities

a. Field artillery is the principal agency of ground fire support. It is equipped with mobile cannon, rockets, guided missiles, and equipment required for fire control, movement, observation, and communication. It provides a powerful means of influencing the course of combat. The efficient exploitation of field artillery capabilities depends upon control, liaison, communication, observation, location and evaluation of targets, survey control, and logistical support. The capabilities include the ability to—

- (1) Maneuver massed fires rapidly within a large area and on a wide front without change of positions.
- (2) Displace quickly.
- (3) Regroup units to bring greater fire power on important sectors.
- (4) Deliver accurate fire with appropriate caliber and type of ammunition on targets encountered under all conditions of visibility, weather, and terrain.
- (5) Deliver fires with or without adjustment. The latter method enhances the effect of fires by shock and surprise.

b. Antiaircraft artillery is equipped with guns, automatic weapons, rockets, guided missiles, and the equipment required for observation, warning, fire control, and communication. Antiaircraft artillery is used primarily to provide protection for field forces and other important civil and military ground establishments against all forms of enemy air activities by day and by night. Some AAA weapons may also be employed as field artillery. AA weapons may be used effectively for direct fire against tanks, fortifications, and small naval or landing craft. Capabilities of antiaircraft artillery include the ability to—

- (1) Attack aerial targets flying at varying altitudes and speeds under all conditions of weather and visibility.
- (2) Operate the antiaircraft artillery information service (AAAIS) and provide other arms and services with warning of the approach of hostile aircraft (par. 229).
- (3) Fire direct and indirect fire on surface targets (par. 104).

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5. Limitations

The principal limitations of both field and antiaircraft artillery are their reduced effectiveness and increased vulnerability during displacement.

a. Field Artillery. Adequate control is essential to the maximum effectiveness of field artillery. This control depends on close liaison with supported, supporting, and adjacent units; on adequate observation, accurate maps or survey; and dependable signal communication. Without adequate, timely intelligence and efficient fire control procedures, artillery cannot capitalize on targets of opportunity. It is particularly vulnerable to enemy air action. It requires large amounts of ammunition. Maximum accuracy requires registration which may sacrifice surprise.

b. Antiaircraft Artillery.

- (1) In its antiaircraft mission, the effectiveness of antiaircraft artillery depends upon its freedom to engage airborne targets at maximum ranges. This freedom can be achieved only by the adoption of realistic rules of engagement. Antiaircraft artillery must therefore have timely intelligence, target acquisition, and effective liaison with subordinate, adjacent, and higher antiaircraft artillery units and with friendly air forces. Antiaircraft artillery cannot prevent aircraft from attacking a defended area if the enemy is willing to accept the losses involved.
- (2) In its surface mission, antiaircraft artillery cannot attack targets in deep defilade. Antiaircraft artillery weapons have high silhouettes.
- (3) Antiaircraft artillery expends ammunition rapidly during engagements. Except for self-propelled units, it is relatively less mobile than other artillery.

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CHAPTER 3

ARTILLERY ORGANIZATION

6. General

The detailed organization of artillery units and headquarters is shown in appropriate tables of organization and equipment. The composition, in terms of units, of artillery echelons above battalion is flexible and is determined by the organization for combat (pars. 56-62).

7. Artillery Battalion-Group

In the absence of a group or other suitable headquarters, one or more battalions may be attached to another battalion to form a battalion-group (pars. 17 and 78). The battalion-group headquarters has the same function as the artillery group headquarters.

8. Artillery Group

The artillery group consists of a headquarters and headquarters battery and such artillery units as may be attached. The group provides flexibility in organization of artillery for combat, since the number, type, and caliber of attached units may be varied to meet the needs of the situation. While the units attached to a group may be of the same or different calibers, mixed calibers permit greater flexibility in employment. The group organization provides centralized tactical control as well as a limited degree of administrative supervision.

9. Antiaircraft Artillery Brigade

The antiaircraft artillery brigade consists of a brigade headquarters and headquarters battery and such AAA groups, battalions, operations detachments, and other units as may be assigned or attached. The purpose of a brigade is to provide tactical control and administrative supervision of two or more AAA groups.

10. Division Artillery

Division artillery consists of a headquarters and headquarters battery, and such field and antiaircraft artillery units as are organic, assigned, or attached to the division. It has organically assigned the personnel and equipment necessary for communication and observa-

tion, and the minimum number of battalions required for combat. Additional artillery support is ordinarily provided and is obtained by attaching artillery units to the division or by reinforcing the fire of the division artillery with corps artillery, adjacent division artillery, or artillery of a division in reserve.

11. Corps Artillery

Corps Artillery consists of the corps artillery headquarters and headquarters battery, the field artillery observation battalion and such artillery units as are assigned or attached to the corps and retained under command of the corps artillery commander. *Artillery with the corps* includes the corps artillery and the artillery of the divisions subordinate to the corps.

12. Army Artillery

Army artillery consists of artillery assigned or attached to the army and not reattached to lower echelons. *Artillery with the Army* includes army artillery and artillery with the corps subordinate to the Army. The artillery section of army headquarters is assisted by subordinate artillery units and lower artillery echelons in the acquisition of targets and direction of army artillery fires.

13. Army Group and Theater Army Artillery

Artillery representation at these echelons consists of artillery staff sections as necessary to fulfill the requirements of the particular organization. Artillery units normally are not retained under control of these headquarters.

14. Antiaircraft Defense Command

An antiaircraft defense command normally is established for each antiaircraft defended area by one of the major AAA echelons. However, if two or more defended areas are close enough together so that their defenses can be integrated, one antiaircraft defense command will be established for both areas. This command will exercise the necessary direct operational control over all Army AAA elements (and over Navy AA elements when directed by an appropriate commander) involved in the defense of the area.

CHAPTER 4

COMMAND, CONTROL, AND COORDINATION

Section I. COMMAND RESPONSIBILITIES AND RELATIONSHIPS

15. General

a. In army group and higher headquarters, the senior artillery officer in the artillery staff section is designated as the *artillery officer*. He is a special staff officer and advises the commander on all artillery matters.

b. In armies, corps, divisions, and task forces, the senior officer in the artillery headquarters (artillery section of army) is designated as the *artillery commander*. He commands artillery units retained under the control of the headquarters. In addition, he is the *artillery officer* on the special staff. As artillery officer he advises the commander and staff on all artillery matters and is the fire support coordinator for the command.

16. Command Relationships

a. Artillery is a member of the tactical team employed by a commander to accomplish a certain mission. The relationship of the artillery commander to the force (supported unit) commander is dependent upon the artillery's status as a member of the team. When the artillery is assigned or attached to the force (supported unit), the artillery officer is both a subordinate commander and a special staff officer of the force (supported unit) commander. When artillery is neither assigned nor attached to the force but is supporting the force, the artillery commander's relationship to the force commander is both that of an advisor and that of an independent commander obliged to render continuous effective fire support in accordance with his assigned mission. In either case, close coordination and liaison between commanders is essential for accomplishment of the mission.

b. There is no direct chain of artillery command from armies to corps or from corps to divisions. Instructions for the artillery with a corps are issued to the corps commander in the name of the army commander. Similarly, instructions for division artillery are issued in the name of the corps commander.

a. In armies, corps, and divisions, the senior antiaircraft artillery commander at each echelon is the adviser to the artillery commander of that echelon on all AAA matters. Normally, tactical fire control of antiaircraft artillery units engaged in air defense is exercised through AAA channels (AAOC to fire units). This includes division antiaircraft artillery units which have been assigned an air defense mission by the division commander. Such delegation of tactical fire control does not relieve the artillery commander of his responsibilities and prerogatives of command. Army, corps, and division SOP's normally will provide for the necessary centralized direction of AAA units engaged in air defense (pars. 101-103).

17. Artillery Battalion-Group Commander

The artillery battalion-group commander is designated by the authority establishing the battalion group. The numerical designation of the battalion-group is that of the parent battalion. He has the same functions and responsibilities as a group commander in addition to commanding his own battalion.

18. Artillery Group Commander

a. The artillery group commander's responsibilities include the following command functions:

- (1) Coordinate observation and survey control within the group.
- (2) Plan fire support as necessary to carry out the group's assigned mission.
- (3) Control the fires of the group.
- (4) Direct training within the group.
- (5) When he is the senior artillery officer with a task force, perform additional duties as outlined in paragraph 20.

b. When an AAA group is operating independently, the group commander has the same functions and responsibilities as an AAA brigade commander. When operating under a brigade, the group commander will have those functions and responsibilities as are directed by the brigade commander.

19. Antiaircraft Artillery Brigade Commander

Whether the AAA brigade is operating in the zone of interior, in the communications zone, in the combat zone, or as part of a task force, the basic duties and responsibilities of the brigade commander are the same. The brigade commander is responsible for the tactical and operational control and administrative supervision of all units assigned or attached to the brigade. This includes the following specific items:

- a. Tactical employment and deployment of all units assigned or attached to the brigade. This includes groups, battalions, operations detachment, and other units.
- b. Establishment and operation of an antiaircraft operations center (AAOC) for each defended area.
- c. Issuance of such necessary immediate operational instructions as are deemed appropriate.
- d. Preparation of plans and standing operating procedures (SOP) to guide the fire unit commanders in the selection of proper targets.
- e. Establishment of conditions of readiness and the transmission of the condition of air raid warning to fire units.
- f. Establishment and operation of an antiaircraft artillery information service (AAAIS) for each defended area.
- g. Supervision of all training of units assigned or attached to the brigade. This includes preparation of training programs, allocation of training resources, administering training tests, and the correction of training deficiencies.
- h. Supervision of supply and administration. This includes determining that the supply and administrative support for subordinate units is adequate and that these units are being properly supplied and administered (this does not mean that the brigade commander will furnish such support to subordinate units).
- i. Issuance of instructions as to the allocation of ammunition when necessary.
- j. Establishment of the necessary liaison with adjacent, higher, and lower units of the Army, Navy, and Air Force.
- k. Supervision of the preparation and rendition of reports required by higher headquarters.
- l. When operating with the field army, the senior brigade commander will act as the advisor to the artillery commander on all AAA matters.
- m. When in an air defense area in which the Air Force is responsible for the air defense, he will act as an advisor to the appropriate air defense commander on all AAA matters.
- n. Recommendations when appropriate, for rules for identification and recognition, rules for engagement, and the establishment or cancellation of restricted areas.

20. Army, Corps, Division, and Task Force Artillery Commanders

The artillery commander of an army, corps, division, or task force has the following principal responsibilities:

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- a. Determine requirements for and recommend allocations and employment of artillery units, materiel, and ammunition. When appropriate, this includes requirements for units and materiel to replace or augment artillery.
- b. Command organic, assigned, and attached artillery not reassigned or reattached to subordinate units.
- c. Plan for artillery fires in support of the plan of operations.
- d. Advise the commander and staff on the employment of artillery atomic fire power.
- e. Coordinate artillery observation within the zone of responsibility of the command (normally limited to echelons below field army).
- f. Establish and supervise the fire support coordination center as fire support coordinator for the command (ch. 15).
- g. Collect, process, and disseminate information and intelligence.
- h. Coordinate survey control for artillery.
- i. Establish and coordinate air defense.
- j. Direct the fire of organic, assigned, and attached artillery not reassigned or reattached to subordinate units.
- k. Recommend assignment of artillery personnel and estimate replacement requirements for artillery units.
- l. Direct the training of artillery units within the command.
- m. Counterfire activities. Corps artillery commander has responsibility for counterbattery activities. Division artillery commander has responsibility for countermortar activities. Task force artillery commanders have responsibility for both counterbattery and countermortar activities. Provided the organization permits, these functions may be reassigned to subordinate artillery commanders.

21. Theater Army and Army Group Artillery Officers

The artillery officer of theater army or army group has such duties and responsibilities as are assigned by the commander. At these levels, the artillery section will consist of personnel experienced in all aspects of artillery. Theater army and army group artillery officers are usually assigned the following responsibilities:

- a. Determine the number and types of nonorganic artillery units required by the forces in the command, including special equipment for the artillery.
- b. Recommend the allocations of the various types of artillery to subordinate commands.
- c. Advise on air defense matters and conduct air defense coordination with appropriate Navy and Air Force headquarters subject to theater policy.

[REDACTED]

d. Recommend assignment of artillery personnel and estimate replacement requirements for artillery units.

e. Supervise the training of artillery units and artillery replacement personnel within the command and the operation of such artillery schools as may be under the control of the commander.

f. Publish information and intelligence of interest to artillery.

g. Plan for the reception and processing of artillery within his echelon.

h. Determine ammunition requirements and recommend allocation of ammunition.

i. Exercise, in the name of the commander, operational control of those artillery units which have not been assigned or attached to subordinate units.

22. Antiaircraft Defense Commander (AADC)

For each AA defended area(s) there will be an AA defense command. The senior (or designated) AAA unit commander or other designated artillery officer present is the AA defense commander. He exercises direct operational control over all army AAA elements (and over navy AA elements when directed by an appropriate commander) in the defense.

Section II. ARTILLERY STAFFS

23. General

a. The organization and functions of the staff are flexible and may be varied by the artillery commander to meet the demands of each particular situation. Since the control of artillery and the coordination of fire support are the principal duties of an artillery commander, his staff is organized to assist him in the discharge of these responsibilities.

b. The composition and organization of theater army and army group artillery staffs are determined by the artillery officer. He organizes his staff to aid him in carrying out his responsibilities (par. 21).

c. Personnel for artillery staffs at army level and below are provided in appropriate tables of organization. Type functional organizations are shown in figures 1 through 5.

d. The duties of artillery staff officers conform generally to the principles and procedures described in FM 101-5 for the corresponding general or special staff officers. Amplifications of duties are discussed in the following paragraphs.

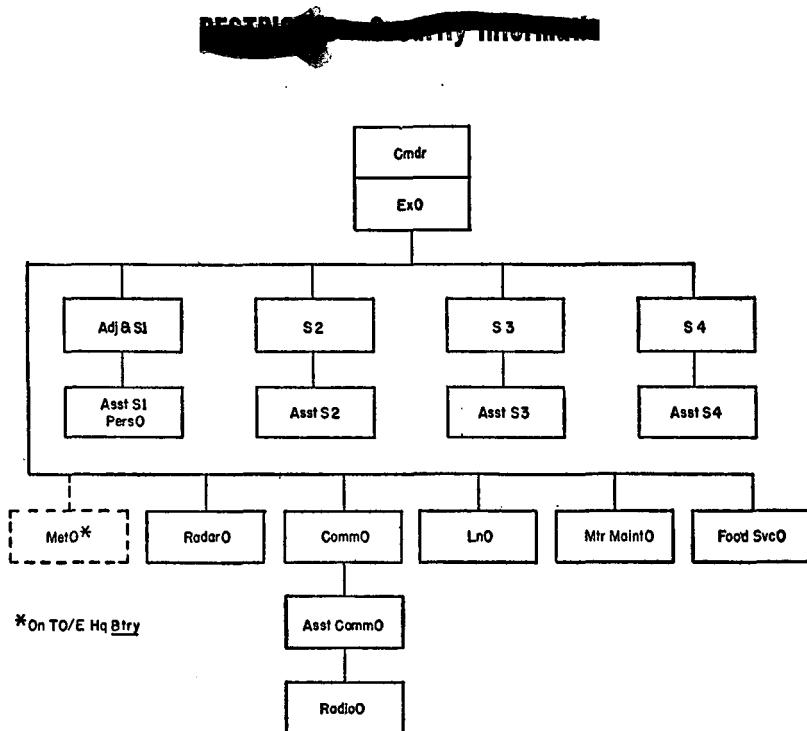


Figure 1. Type organization of AAA group staff.

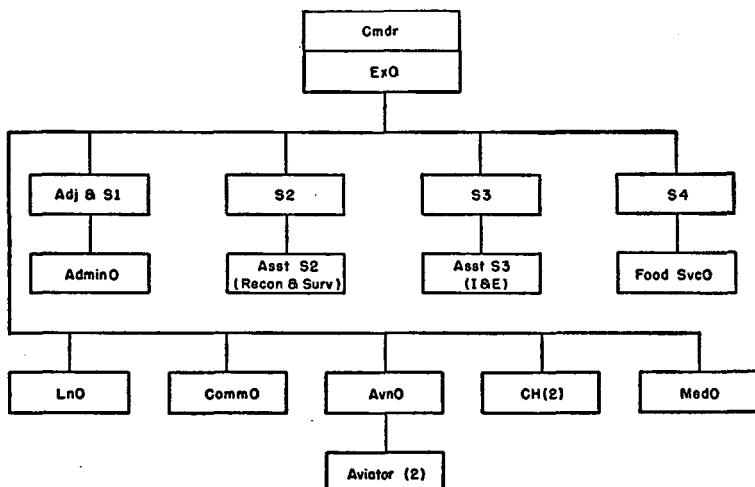


Figure 2. Type organization of field artillery group staff.

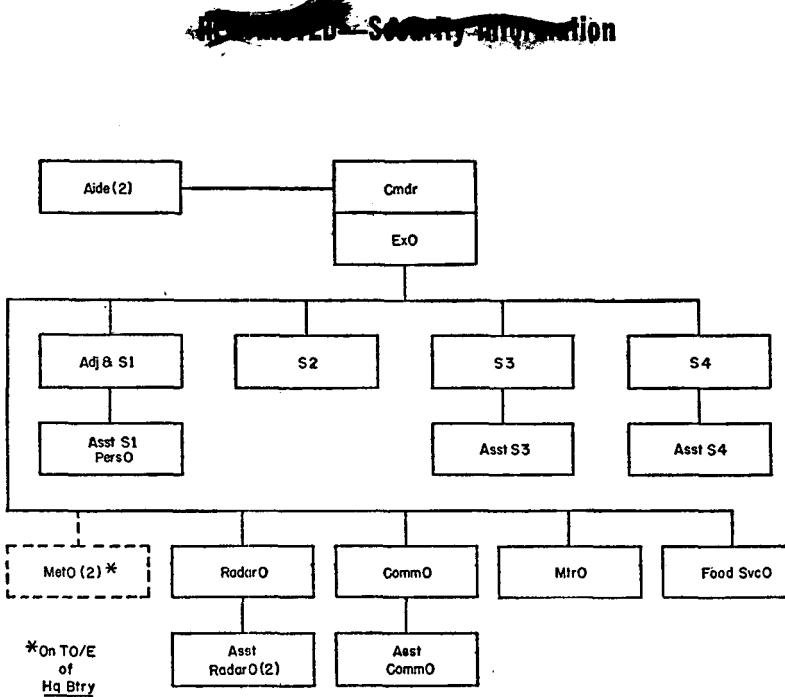
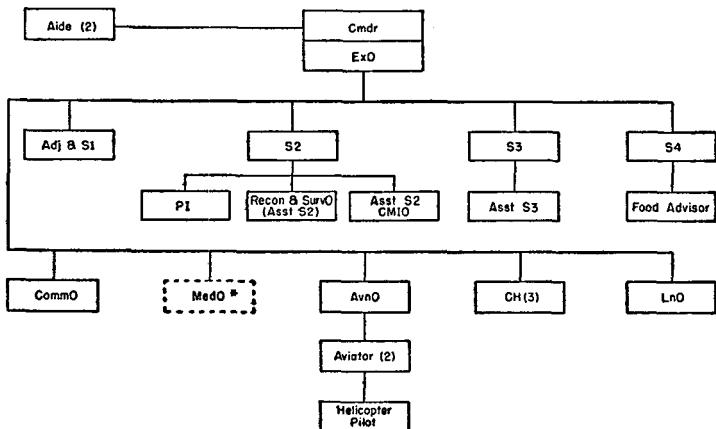


Figure 3. Type organization of AAA brigade staff.



* From Medical Detachment

Figure 4. Type organization of division artillery staff.

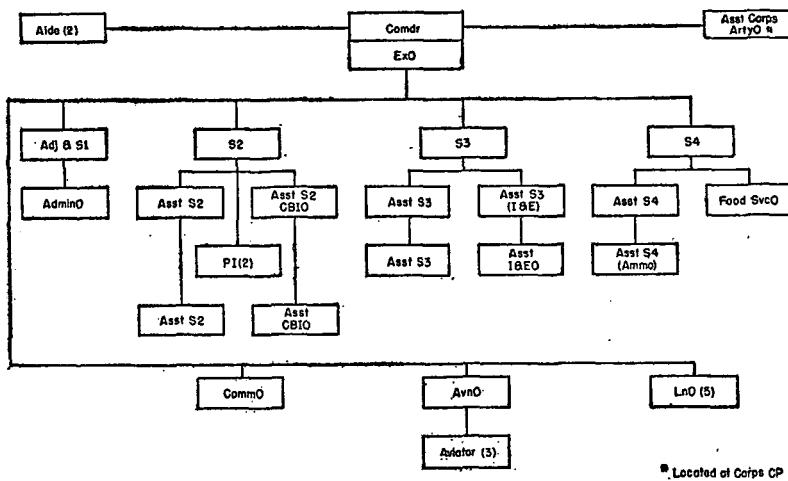


Figure 5. Type organization of corps artillery staff.

24. Assistant Artillery Officer (Corps Artillery Only)

The assistant artillery officer performs such duties as may be assigned to him by the corps artillery commander. These duties may require him to—

- a. Serve as the corps artillery commander's deputy at the corps command post.
- b. Supervise and coordinate the work of artillery personnel at the corps command post.
- c. Act for the corps artillery commander in his capacity as fire support coordinator (ch. 15).

25. Executive

a. In general, the executive officer of an artillery staff performs the duties as set forth in FM 101-5 for the Chief of Staff. Additionally, he may—

- (1) Direct the establishment of the artillery command post in the location designated by the commander and insure that the various elements, properly protected and concealed, are disposed to facilitate operations.
- (2) Supervise the operation of the artillery command post to include the fire direction center (antiaircraft operations center).

b. The corps artillery executive's duties may vary considerably from those outlined in FM 101-5 for the Chief of Staff because the corps artillery executive's duties normally complement those of the assistant corps artillery officer (par. 24).

26. Adjutant (S1)

The S1 or adjutant of an artillery staff is the advisor to the commander on matters pertaining to personnel and general administration. When a separate S1 is not provided, the commander designates another staff officer to perform his duties.

27. S2

The S2 of an artillery staff is primarily concerned with the direction of the target intelligence effort of artillery agencies (ch. 10). His specific duties include—

a. The initiation of a systematic and coordinated search for target information to include targets suitable for atomic attack by all available collecting agencies. To accomplish this, he must—

- (1) Coordinate, through the normal chain of command and through staff contacts, the work of intelligence personnel in subordinate commands. This includes the coordination of observation facilities, including organic aviation, and the coordination of the intelligence reporting system of subordinate units.
- (2) Maintain close liaison with the intelligence sections of higher, lower, adjacent, and supported units for the purpose of exchanging information and mutual assistance in the location of targets.
- (3) Foresee the need for, obtain, and distribute maps, photo maps, and air photographs.
- (4) Study and interpret air photos when no photo interpreter team is available. Supervise their activities when present.
- (5) Direct the operation of countermortar (division) and counterbattery (corps) intelligence activities as described in chapter 16.
- (6) Originate requests for reconnaissance missions by Air Force type aircraft.

b. The evaluation and interpretation of information and dissemination of target information and intelligence in time for units to take appropriate action.

c. Keeping the artillery commander, staff (FDC, AAOC, and FSCC), and subordinate units informed of the enemy situation and capabilities.

d. Close collaboration with the S3 on intelligence and operations matters.

e. Examination of maps, photo maps, and air photographs for reliability of control and dissemination of this information to subordinate units.

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- f. Providing the FSCC with available information and intelligence including targets (ch. 15).
- g. Preparation and distribution of required intelligence reports.
- h. Keeping the S2 situation map and any other records pertaining to the S2 section that the situation may require.
- i. Furnishing pertinent data for inclusion in the command report.
- j. Preparing a plan for and supervising the execution of counter-intelligence measures (FM 30-5).
- k. Coordination with the antiaircraft defense commander concerned for the establishment of necessary observation for the antiaircraft artillery information service. Such other antiaircraft intelligence activities as directed by the artillery commander, are performed. These may include—
 - (1) Training of personnel in target recognition.
 - (2) Informing units of recognition signals (in coordination with the communication officer).
- l. Preparation of the artillery intelligence bulletin (corps and division artillery S2 only) for distribution of enemy information to higher, adjacent, and subordinate artillery commanders (to include battalions).
- m. Supervise intelligence training for the artillery.

28. S3

The S3 of an artillery staff is responsible to his commander for activities pertaining to organization, training, operations, and information and education. His duties are to—

- a. Make recommendations to the artillery commander regarding the employment of artillery units.
- b. Formulate plans as directed and prepare operation orders for the approval of the commander.
- c. Keep the commander and staff informed of matters pertaining to training, combat efficiency, and disposition of artillery units.
- d. Plan and supervise artillery training and operations.
- e. Collaborate with other staff officers on matters affecting operations.
- f. Prepare artillery fire plans.
- g. Make recommendations for the use of artillery atomic fire power.
- h. Coordinate and integrate artillery plans of subordinate units with each other and with the plan of operations (ch. 12 and ch. 15).
- i. Provide the FSCC with current artillery fire capabilities.
- j. Keep S4 informed of ammunition requirements.
- k. Recommend allocations and reallocations of artillery units to subordinate commands.

- l. Plan and supervise artillery liaison activities.
- m. Keep current at FDC the information on the friendly tactical situation and, as appropriate, furnish this information to FSCC.
- n. Obtain and distribute meteorological messages.
- o. Keep the communication officer informed of all plans affecting signal communication requirements.
- p. Supervise the unit's information and education program.
- q. Supervise the preparation of pertinent records and reports.
- r. Exercise staff supervision over fire direction activities (except AAA in air defense role).

29. S4

The S4 of an artillery staff is responsible to his commander for the coordination and supervision of all logistical functions of the organization. Although all S4's have the general duties outlined for the G4 in FM 101-5, there is a difference between S4's in respect to their echelon, the scope of their operations, and the assistance they receive in carrying out their logistical responsibilities. Artillery battalion S4's are operating S4's, that is they have the means at their disposal to procure and distribute supplies and, if necessary, to establish supply points. The artillery echelons with which this manual is concerned do not have the means to procure and distribute supplies, therefore these nonoperating S4's are concerned primarily with coordination and supervision. Specifically their duties are to—

- a. Prepare and supervise the execution of a plan for the timely supply of artillery ammunition (ch. 18).
- b. Keep the commander and staff informed of the ammunition status of the command.
- c. Keep appropriate records of the overall artillery ammunition status, location of ammunition offices and ammunition supply points, and available transportation.
- d. Keep a current record of all traffic data and information on road nets.
- e. Supervise all supply functions of the command to assure adequate procurement and proper distribution.
- f. Keep a record of critical items of equipment and supplies.
- g. Prepare, authenticate, and distribute administrative orders.

30. Liaison Officer

The technique of liaison is discussed in paragraph 37. The principal duties of artillery liaison officers are to—

- a. Represent the artillery commander at the headquarters to which sent.

- b. Keep the headquarters to which he is sent informed of the situation and capabilities of the command he represents.
- c. Keep his own headquarters informed of the situation and capabilities of the command with which he establishes liaison.
- d. Facilitate necessary coordination and cooperation between units.
- e. Perform specific functions as directed.

31. Communication Officer

The principles and techniques of communication for artillery are discussed in paragraph 38 and chapter 17. For details of signal communication, see the field manuals of the 24-series. The principal duties of the artillery communication officer are to—

- a. Advise and assist the artillery commander on signal communication matters.
- b. Plan and recommend the unit communication system and be responsible to the commander for its installation and operation.
- c. Obtain and distribute signal operation instructions (SOI) and standing signal instructions (SSI).
- d. Prepare prearranged message and other authorized codes.
- e. Assist subordinate units in procurement of signal supplies.
- f. Supervise communication training throughout the unit.
- g. Recommend the location of key installations within the command post area.
- h. Supervise the maintenance of signal communication equipment in his own and subordinate units.
- i. Coordinate the use of existent and planned communication facilities with the communication officers of adjacent and supported units.
- j. Advise the commander and staff on such electronic countermeasures and counter countermeasures as pertain to communication.

32. Army Aviation Officer

The principal duties of the army aviation officer are to—

- a. Supervise the operations of the organic aviation section (pars. 92-95).
- b. Determine the requirements for and recommend the allocation of aircraft and aircraft supplies for his own section and subordinate commands.
- c. Supervise and coordinate the selection, preparation, and operation of landing fields for the command.
- d. Recommend, plan for, and coordinate the employment of artillery army aviation sections for the command.
- e. Maintain close staff liaison with subordinate army aviation officers.

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f. Supervise the training of army aviation sections within the command.

33. Radar Officer (AAA)

The duties of the radar officer on AAA unit staffs are to—

- a. Advise the commander and staff on all radar matters.
- b. Advise and aid the S3 in organizing and supervising radar training programs.
- c. Submit necessary reports and keep pertinent records.
- d. Supervise radar maintenance.
- e. Provide liaison on radar matters with higher headquarters.
- f. Advise the commander and staff on the radar portion of the AAAIS coverage of the AA defense.
- g. Advise and assist S4 in procurement of radar supplies.
- h. Maintain clutter and coverage diagrams in the AAOC.
- i. Advise the commander and staff on such electronic countermeasures and counter countermeasures as pertain to radar, and recommend to the S3 training measures on these subjects.

34. Reconnaissance and Survey Officer

In the performance of his duties, the reconnaissance and survey officer is closely associated with the commander, S2, S3, and the survey officers of higher headquarters, subordinate, and adjacent units. His specific duties include—

- a. The preparation of a survey plan.
- b. Obtaining control and carrying control to subordinate units (par. 68).
- c. Execution of the survey plan.
- d. Conduct of reconnaissance for routes, position areas, and observation as directed by the commander.
- e. Supervision of survey training within the command.
- f. Continuous planning for future reconnaissance and extension of survey.
- g. Close collaboration with the S2 and S3 in securing needed information on target location, observation, routes, and future position areas.
- h. Exchanging survey data and information with the survey officers of higher headquarters, subordinate, and adjacent units.

This may include establishing a survey information center (par. 69).

- i. Determination of the accuracy of available maps.

35. Other Staff Officers

Duties of other artillery staff officers in echelons above the battalion, such as the chaplain, the surgeon, and the dental surgeon are as outlined in FM 101-5.

Section III. CONTROL AND COORDINATION

36. General

The efficiency with which artillery fires are employed depends upon adequate control of artillery and its coordination with the supported units. Artillery fires also require coordination with those of other fire support agencies. Various means by which necessary control and coordination are effected are discussed below.

37. Liaison

a. General. Liaison (FM 101-5) is maintained between units to insure mutual understanding and unity of purpose and action. Liaison is usually accomplished by the mutual exchange of information carried out by a unit's representative visiting or remaining with another unit. Artillery liaison is established by the supporting unit with the supported unit; by the reinforcing unit with the reinforced unit, and may be established between subordinate and higher headquarters and between adjacent units. Liaison between subordinate and higher headquarters is established as directed by the higher commander and between adjacent units upon the initiative of adjacent commanders or upon orders from higher authority.

b. Command Liaison. Through personal contact, artillery commanders establish command liaison with supported commanders. The liaison established by commanders is maintained continuously by liaison officers furnished by the unit which has the responsibility of establishing liaison.

c. Liaison Officers. The liaison officer is the commander's personal representative to the unit with which liaison is established. He must be thoroughly familiar with the situation and plans of his own unit and with the policies of his commander and make such information available to the commander and staff of the visited unit. He familiarizes himself with the situation and plans of the unit to which sent and secures and transmits desired information to his own unit. Frequent changes of liaison officers are undesirable. However, in situations requiring prolonged absences of liaison personnel from their command it may be desirable to rotate these individuals so that they may keep abreast of the current situation, plans, and policies of their own command.

d. Staff Liaison. Liaison duties are not restricted to liaison officers specifically appointed as such, but may be performed by any staff officer or other designated officer. A staff officer making a staff visit to another headquarters is, in effect, performing liaison duties. Liaison between staff sections of one unit and the same or similar staff

sections of an associated unit is desirable in the furtherance of cooperation and coordination between units. In effecting such liaison, staff officers act only within the limits set by policies of the commander.

38. Communication

a. The ability of the artillery to render effective fire support is dependent upon efficient communication. The artillery commander must rely on his communication system in controlling and coordinating the fires of his units. Without effective signal communication, a commander and his staff are isolated and become ineffective. The commander of each echelon of artillery is responsible for the installation, operation, and maintenance of the signal communication system of his command. He is responsible that appropriate personnel of his command are adequately trained in the use of the various means of communication. The communication officer of each artillery unit exercises immediate supervision over the installation, operation, and maintenance of the unit's communication agencies. He is also responsible for advising the commander on the employment of all communication facilities available to the unit.

b. To insure coordination, the commander of each tactical unit exercises both tactical and technical control over communication agencies of subordinate units. Tactical control insures the establishment of necessary communication between units in accordance with the tactical plan. Technical control standardizes the installation, operation, and maintenance of the various means of communication. To expedite technical control, the communication officer deals directly with the communication officers of subordinate units.

c. Artillery communication includes all the available means employed to transmit orders, intelligence, and commands between artillery units and to establish liaison with supported and adjacent units. Communication for artillery units normally will be provided by communication personnel of the unit. For details on artillery communication, see chapter 17.

39. Command Post

Artillery command posts are located to facilitate tactical control of subordinate artillery units and to effect close coordination with the supported unit and other means of fire support or air defense. When artillery units can be effectively controlled from the vicinity of the supported unit command post (CP), the artillery CP is located there. Frequently, corps artillery, division artillery, and field artillery unit commanders may find that in locating the command post, requirements for control of subordinate units conflict with requirements for coordi-

nating with the force or supported units. It is then advisable to echelon their headquarters. That echelon that controls the subordinate artillery units is located centrally with respect to those units to facilitate communication with them. This echelon is called the fire direction center (ch. 13). That echelon that effects close coordination of fire support with the operations and planning of the supported unit is located at the CP of the supported unit when possible and is a part of the fire support coordination center (ch. 15). The headquarters battery and other elements of the artillery headquarters are normally located near the FDC. For air defense, the antiaircraft operations center (ch. 14) is the battle or tactical headquarters portion of the antiaircraft artillery command post.

40. Estimates of the Situation, Plans, and Combat Orders

Artillery commanders must plan for and recommend the assignment, organization, and employment of artillery prior to the announcement of the commander's decision. Additionally, as fire support coordinators, they must anticipate the requirements for, coordinate, and recommend the employment of other fire support means. To accomplish this, the artillery commander's estimate of the situation and his planning to provide the best possible fire support and air defense under all conditions must be continuous. These plans, as approved, are incorporated into the instructions issued for the employment of the force. With each change in the situation, the artillery commander must reexamine all considerations involved and decide whether changes in fire support or air defense measures are advisable. This continuous process is carried on concurrently at the successive echelons and in close collaboration with the force (supported) commander and his staff. A discussion of the techniques involved in the preparation of estimates of the situation, plans, combat orders, and standing operating procedures is contained in FM 101-5. For appropriate forms and samples, see appendix II.

41. Coordinating and Limiting Measures

a. Zones of Fire. Artillery commanders coordinate field artillery fires laterally and in depth by assigning zones of fire to subordinate units. Normally the zone of fire for a direct support unit is the zone of action of the supported unit. Other artillery units are assigned zones of fire to insure complete artillery coverage and to provide for the massing of the bulk of the artillery at points critical to the success of the operation. Lateral limits within which a unit must be able to fire are designated by points or lines. Zones in depth may be prescribed by assigning position areas or by prescribing minimum range

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lines and lines to be reached by all or part of the fire power of a unit. Zones of fire are assigned with the tactical mission (par. 59).

b. No-Fire Lines. The no-fire line is a line beyond which artillery units may fire without prior clearance from the direct support artillery. The location of the no-fire line is established by the direct support artillery commander in coordination with the supported unit commander. The direct support artillery keeps division artillery headquarters informed of changes to the location of the no-fire line. Division artillery coordinates direct support artillery's no-fire lines and disseminates their locations to all division artillery units, units reinforcing division artillery, and to corps artillery headquarters. Corps artillery headquarters coordinates division no-fire lines and transmits location of the no-fire lines to corps artillery units, to the artillery of other divisions of the corps, and to adjacent corps. Direct support artillery is authorized to fire short of the no-fire line in its own sector. Other artillery units must obtain clearance from the direct support artillery concerned prior to firing short of the no-fire line. Before executing fire missions short of the no-fire line and near the supported unit's boundaries, the direct support artillery *must* coordinate with the direct support artillery of the affected, adjacent unit.

c. 0-0 Line. The 0-0 line is a line established by corps artillery (par. 65) as a means of coordinating in depth the search for targets. To the extent possible, the attention of division artillery intelligence agencies is focused on the area short of the 0-0 line; that of corps artillery beyond the line. This arbitrary division, however, is not intended to restrict zones of observation or attack of targets. The line should be designated by terrain features. The location of the 0-0 line is changed as the situation develops.

d. Bomb Line. The bomb line is an imaginary line established by ground forces beyond which Air Forces may attack targets without danger to or reference to ground troops. When practicable, the bomb line will be delineated by well defined geographical features. The G3 Air working in the division fire support coordination center submits the recommended location of the bomb line and changes thereto, to corps G3 Air in the corps FSCC. Corps G3 Air submits the recommended bomb line to the army G3 Air in the joint operations center (JOC). The final location of the bomb line is established at JOC in coordination between army and tactical air force and is disseminated to subordinate units. When requested or cleared by ground troops, targets of opportunity short of the bomb line can be attacked by tactical aircraft. The bomb line should be located as near the forward elements as practicable consistent with the safety of friendly troops. During an attack the bomb line should be located sufficiently far out

to prevent unnecessarily frequent changes. Pilots in flight must be able to identify the bomb line by terrain features.

e. AAA Fire Restrictions.

- (1) The joint chiefs of staff or their designated agency will define and promulgate general rules governing the establishment of areas and zones specified in FM 110-5. The joint chiefs of staff acting through the appropriate agencies, will prescribe the basic rules for engagement necessary to prevent mutual interference. Necessary detailed rules and procedures in consonance with the basic rules will be promulgated by subordinate commanders. The definition of "areas" and the detailed rules for engagement will be included in local SOP's. Certain restrictions may be placed upon antiaircraft artillery firing. Such restrictions normally will be as follows:
 - (a) Fire of AAA may be restricted to permit friendly aircraft to enter or leave the area. These aircraft will adhere to prescribed routes and altitudes.
 - (b) Emergency restrictions of AAA fire may be requested by the Air Force to permit damaged friendly aircraft to reach their base.
 - (c) To protect friendly troops and installations, a minimum firing elevation may be designated for AAA weapons. In such cases the minimum firing elevation applies to AA fire only; it does not restrict AAA fire at ground targets.
- (2) The order to withhold AA fire (HOLD FIRE) normally will be in conformity with the following:
 - (a) It should ordinarily apply to specific flights or formations of aircraft, or to aircraft approaching from a certain direction at a specified altitude or within a specified altitude band, during a given period of time.
 - (b) When under special conditions, it becomes necessary for friendly aircraft to fly over a restricted area, contrary to established procedure, a clearance should be requested for that specific flight.
 - (c) Notwithstanding a HOLD FIRE restriction in effect, fire is permitted at other aircraft not covered by the restriction in accordance with prescribed rules for engagement for that area.

f. Air Defense Restricted Areas.

- (1) *General.* Air defense restricted areas are areas in which there are special rules for the routing of friendly aircraft and the engagement of unidentified or hostile aircraft. Spe-

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cial restrictive measures are employed to prevent or minimize interference between friendly forces.

(a) *Inner artillery zone (IAZ)*. An inner artillery zone is an air defense restricted area applied to specified air spaces within gun defended areas which are denied to friendly aircraft under all conditions.

(b) *Gun defended area (GDA)*. A gun defended area is an air defense restricted area defined as the zone and the air space above it which is denied to friendly aircraft except under certain specified conditions.

(2) *Rules for engagement in air defense restricted areas*. The following are general rules for engagement of aircraft by AAA in air defense restricted areas.

(a) *Inner artillery zone (IAZ)*. AAA in an IAZ will engage all targets *not* recognized as friendly, whether or not warning has been received. When the Air Force has requested an emergency restriction of AAA fire and the request has been granted, the AAA will not fire at the aircraft covered by the restriction.

(b) *Gun defended area (GDA)*. AAA guns in a GDA will engage all targets entering the area and not conforming to the prescribed flight procedure of the area, unless prior clearance has been obtained for aircraft to pass over the area or emergency restriction of fire has been requested and granted.

(3) *Rules for engagement in nonrestricted areas*. Antiaircraft artillery in nonrestricted areas will engage aircraft in accordance with the rules for engagement prescribed by the theater commander and the following basic rules for engagement:

(a) All aircraft recognized as hostile will be engaged.

(b) All aircraft committing a hostile act will be engaged. Hostile action includes—

1. Attacking friendly installations or aircraft.
2. Dropping flares over friendly territory at night.
3. Diving on friendly troops, ships, or installations.
4. Failure to conform to the operational SOP governing action of friendly aircraft.
5. Dropping personnel by parachute in greater numbers than that of a normal crew.
6. Engaging in mine planting.
7. Engaging in any type of radar jamming.

Section IV. ESTIMATE OF ARTILLERY REQUIREMENTS

42. Responsibility

a. The artillery officer of an echelon ordering or conducting an operation is responsible for making the estimate of the artillery requirements. When making such an estimate the artillery officer considers the eventual organization for combat and the practicability of assembling the necessary artillery and ammunition at the time and place desired. Subordinate artillery commanders may assist in the preparation of the estimate.

b. Artillery estimates are made to determine the number and types of artillery units, the amount of ammunition required to support the contemplated operation effectively, and the allocations of each to subordinate echelons.

43. Basis of Artillery Estimates

a. A large assemblage of artillery units is not a substitute for skillfully employed artillery and accurate artillery fire. The minimum requirements are that sufficient artillery is available to—

- (1) Place the required mass of fire on important targets.
- (2) Attack effectively all enemy installations that affect planned operations during any anticipated phase.

b. The amounts and types of artillery required for an offensive action depend primarily on the plan of the commander and the character of the enemy resistance expected. Generally, units making secondary efforts will be allotted only limited amounts of artillery in order to permit the massing of artillery on other fronts where decisive offensive action is contemplated.

c. The amounts and types of artillery required for a defensive action depend primarily on the capabilities of the enemy, the terrain, and the plans of the commander.

44. Estimate of Artillery Requirements

a. Estimates of artillery requirements are the responsibility of artillery commanders at all levels. The requirements for AAA are based upon the criteria for determination of priorities for air defense and the basic considerations which affect allocation of means.

b. Artillery requirements vary so widely that no fixed data can be furnished. FM 101-10 contains tables showing basic loads, effects of projectiles, and experience tables for expenditures of ammunition for various types of operations; these are of assistance in making initial artillery estimates. (Read caution page iii of FM 101-10 prior to use.) As a campaign progresses, accurate experience data applica-

ble to the conditions encountered should be compiled by artillery commanders as a guide for the conduct of future operations. Among the factors that must be considered in estimating number and types of artillery units and amounts of ammunition required are—

- (1) Type of operation (attack, defense, delaying, special operation, etc.) and supporting fires.
- (2) Tentative plan of operation and tentative fire plans.
- (3) Terrain and weather.
- (4) Comparative strength of our own and opposing forces, to include morale, training, and supply.
- (5) Assistance that may be expected from air bombardment, naval gunfire, reinforcing fires by tanks and antiaircraft artillery, or other means of support.
- (6) Composition, tactics, disposition, and organization of enemy force.
- (7) Strength, types, and ranges of opposing artillery.
- (8) Enemy artillery techniques.
- (9) Time available and capacity of road net.
- (10) Front and depth of main and secondary attacks.
- (11) Ammunition available (quantity and type).
- (12) Allowance for losses during combat.
- (13) Type enemy fortifications and defenses to be encountered.

45. Determination of Priorities for Air Defense

a. *General.* Usually there will be insufficient means to carry out air defense of all vital areas. It is therefore necessary to determine priorities for air defense and allocate means to vital areas. The determination of the priorities and allocation of means is a continuous process.

b. *Criteria.* The following are the basic criteria in determining priorities for air defense:

- (1) *Selection.* Selection of vital areas that are most necessary for the accomplishment of the overall mission.
- (2) *Assailability.* The enemy's ability to hit the particular installation which is desired to be kept in operation.
- (3) *Vulnerability.* The degree of susceptibility of a particular installation to damage from a given type and/or weight of attack by the enemy.
- (4) *Recuperability.* The ease and speed with which an installation can be rehabilitated in case it is damaged or destroyed by enemy attack.

(5) *Criticality.* A measure of the importance of an installation in relation to alternate means that will provide the same contribution to the military potential.

46. Allocation of AA Means

a. Allocation Considerations. Having determined the priorities for air defense, it will next be necessary to allocate the means available. The following general considerations affect the employment of interceptor aircraft and antiaircraft units in the air defense mission. Each should be allocated—

- (1) In accordance with one plan.
- (2) On the basis of availability.
- (3) To exploit its capabilities and to minimize the effect of its limitations in order to contribute the most to the overall air defense.

b. Antiaircraft Artillery Allocation. The following additional considerations will affect the allocation of antiaircraft artillery to the various local defenses:

- (1) Amount and types of AAA available.
- (2) Other air defense means which are available.
- (3) Priorities established (par. 45).
- (4) Enemy tactics and capabilities as compared to the nature of the vulnerable area.
- (5) Minimum defense needs.
- (6) Civilian or military morale.
- (7) Importance of the vulnerable area to the accomplishment of the mission. It is under this heading that the determination is made of how much additional AAA, over and above the minimum defense needs, will be allocated to any one vulnerable area.

47. Responsibility for Determination of Priorities and Allocation of AA Means

In the combat zone, the army commander is responsible for the air defense of his zone of action. An air defense plan is formulated by representatives of the various services present in the one and approved by the commander concerned. The determination of priorities and the allocation of *air defense resources* in the combat zone are a joint responsibility shared equally by the army commander and the tactical air force commander (and, if present, naval commander). They carry out this responsibility by consideration of mutual requirements and the requirements for air defense of the elements of any other service that may be present in the combat zone. Responsibility for the em-

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ployment and the allocation of *antiaircraft artillery resources* rests with the army commander.

48. Special Operations

Special operations require consideration of the factors listed in paragraph 44. Requirements for special operations are discussed in detail in chapter 9.

49. Estimate of Ammunition Requirements

a. The factors affecting ammunition estimates are the same as those affecting the estimates for artillery weapons and units (par. 44). Estimates must be realistic and based on anticipated expenditures (ch. 18). A guide for making estimates, based on various types or phases of combat, is contained in FM 101-10. The information contained in FM 101-10 must not be considered as binding upon units in combat. It is the responsibility of artillery commanders at all levels to maintain adequate records to permit development of ammunition requirement factors based upon actual experience.

b. When estimated ammunition requirements exceed availability, it is necessary to modify anticipated or planned rates of expenditures or postpone or abandon the contemplated operation depending on the accumulation of the required stocks at army or theater level.

CHAPTER 5

TACTICAL EMPLOYMENT OF FIELD ARTILLERY

Section I. PRINCIPLES OF EMPLOYMENT

50. General

Through the maneuver of artillery fire, commanders possess a powerful means of influencing the course of combat. Field artillery is capable of delivering fire over a zone of great width and depth, and of rapidly shifting and concentrating its fire without changing its position. The principles of war (FM 100-5) apply to artillery as to all other arms. The principles of mass, economy of force, surprise, and maneuver (flexibility) have special application in the case of artillery as does the factor of cooperation.

51. Cooperation

Artillery supports and protects the other arms by fire. In providing this support it is essential to know when, where, and in what form the other arms require it. This information can be provided, for the most part, only by the commanders who are planning and directing the operation, or by the troops who are in contact with the enemy. Close and continuous liaison is therefore necessary, both in planning and throughout the battle, between force (supported unit) commanders and their artillery commanders. The integration of fire support such as air, naval gunfire, and artillery requires coordination which cannot, in the absence of unified command, be accomplished without cooperation.

52. Mass

The proper tactical and technical employment of artillery fire power exploits the principles of mass and maneuver. Artillery weapons and units are not physically massed in the manner implied for ground gaining arms, rather artillery is so employed as to provide the maximum capability for massing its *fires* when and where required to support the action of the ground gaining arms.

53. Maneuver

Mass and maneuver are interrelated. While massing implies the ability to concentrate a large volume of fire on a single target, ma-

neuver implies the capability to transfer and distribute fire rapidly from one point or area to another, over a wide frontage, as the tactical situation dictates. It also implies the ability inherent in the mobility of FA units, to displace rapidly as well as the capability of quickly altering the organization for combat (par. 56) to place the bulk of fires where needed. Maneuver, therefore, involves the control of massed fire power by those subordinate artillery commanders who are in immediate touch with the situation in forward areas. This control must be freely delegated by superior commanders when speed is a primary consideration. Such flexibility of control is dependent upon the speed and reliability of the communication system.

54. Economy of Force

a. Economy of force requires that artillery be employed in conformance with the principles of mass and maneuver. Furthermore, the coordination of artillery fires with the other means of fire support must be such that the full weight of the artillery is placed on those targets which cannot be engaged with equal or greater effect by other means.

b. Economy of force also implies that the effort allocated to any task shall not exceed that necessary to produce the desired effect. The ability of the artillery to fulfill its function depends ultimately upon the availability of ammunition; unnecessary expenditures involve a waste of effort through the whole channel of supply from factory to weapon. Therefore, strict control of ammunition expenditures is a primary consideration in attaining true economy of force.

55. Surprise

The principle of surprise is as important to the proper employment of artillery as to that of any other arm. Means of achieving surprise include concealment and camouflage, night occupation of positions, use of temporary and dummy positions, use of survey and transfer of fire techniques, restrictions on registration, firing from unexpected directions and in unexpected volume, and the avoidance of stereotyped methods.

Section II. ORGANIZATION FOR COMBAT

56. General

Organization for combat places each artillery unit in a tactical organization and assigns each unit a tactical mission (par. 59). Where the situation demands, artillery units may be attached to other forces to provide the required support. In the division, artillery normally is organized for combat to provide: close fire support for front-line

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units; weight to the division main effort (offense) or additional strength to vulnerable areas (defense); immediate massed fire support with which the division commander can influence the action; close fire support for the division reserve when it is committed; and antiaircraft protection for the division. Corps artillery is organized for combat to provide: depth to combat; an immediate reserve of massed fire power with which the corps commander can influence the action; augmentation of the fire support provided by the division artilleries; and antiaircraft protection of the corps. Artillery units attached to corps may be reattached to divisions. Army artillery is organized for combat to provide long-range interdiction of the battlefield and antiaircraft protection for the army.

57. Objectives in Organizing for Combat

In any given situation there will be many combinations that will meet the requirements of a workable organization for combat. A good organization for combat is one which—

- a. Furnishes adequate support for the supported unit.
- b. Provides massed fires where required.
- c. Uses available weapons according to their best capabilities.
- d. Facilitates future operations.

58. Considerations in Organizing for Combat

To obtain an organization for combat that will attain the objectives listed in paragraph 57, certain considerations are pertinent.

a. General.

- (1) Corps artillery, division artillery, and field artillery group commanders retain centralized control of their subordinate units whenever the tactical situation, distance between units, terrain, and communications make it possible.
- (2) Whenever the tactical situation, distance between units, terrain, and communication indicate the necessity; division, corps, and army artillery commanders may decentralize control of their artillery by the assignment of appropriate tactical missions or by attachment of units to subordinate echelons.
- (3) Corps light field artillery battalions are usually attached to division or other subordinate units.
- (4) The field artillery of a reserve division is usually employed in a general support role, or a reinforcing role, modified if necessary (par. 62).
- (5) One field artillery observation battalion is organic to each corps artillery. This battalion functions more efficiently as

a unit and therefore is normally retained under the command of corps artillery. When the corps' operations are decentralized, however, the organization of the battalion permits the attachment of the observation batteries to divisions.

- (6) Field artillery 4.5-inch rocket battalions assigned to an army are usually attached to a corps and retained under corps artillery command until selected for a specific mission. Then they may be further attached to divisions or groups in whole or by batteries. Rocket battalions normally are not attached to regiments or smaller units; however, their organization is designed to facilitate the attachment of a platoon or battery to combat teams or commands for special operations. Standard field artillery missions, except direct support, may be assigned to the rocket battalion.
- (7) The corps artillery's searchlight battery (par. 87) may be assigned a special task, given a mission of general support, or attached to a subordinate unit. Platoons, or in some cases the entire battery, may be attached to a division.
- (8) Field artillery very heavy cannon, very heavy rocket and guided missile units are normally assigned general support missions.

b. *Formation of Tactical Groupings.* Tactical groupings are based on the following considerations:

- (1) *Attachments.* The attachment of an artillery battalion to a corps, division, group, force, or another battalion makes the attached battalion a subordinate element of that command during the period of attachment. The attached battalion receives and executes all orders from the unit to which attached (par. 78).
- (2) *Field artillery groups.*
 - (a) The field artillery group headquarters is capable of controlling two to six battalions.
 - (b) Mixed calibers within a group add flexibility and are desirable. However all calibers should be suitable for the same mission.
 - (c) Command, control, and morale factors are important considerations; therefore, battalions are retained with the same group headquarters insofar as possible.
 - (d) Group headquarters are normally retained under corps artillery control. They may be attached to divisions along with several battalions.
- (3) *Artillery battalion-groups.* When it is desirable for one artillery battalion to exercise control over other artillery

battalions to a degree greater than would exist under reinforcing missions, an artillery battalion-group is formed by attachment to the parent battalion (pars. 7 and 78).

59. Tactical Missions

a. General. A tactical mission is the fire support responsibility that may be assigned to an artillery unit. Tactical missions that may be assigned to artillery units are direct support, general support, and reinforcing. The responsibilities inherent in each type tactical mission are illustrated in figure 6. For tactical missions of antiaircraft artillery, see chapter 6.

b. Direct Support. The term direct support is usually applied to the artillery battalion placed in support of an infantry regiment or combat command. Direct support artillery has the mission of supporting a specific unit of a command. Whenever practicable, a specific artillery unit is habitually placed in direct support of the same unit in order to facilitate teamwork. The direct support artillery commander maneuvers his unit to conform with the plan of the supported unit commander. Direct support artillery is not attached to the supported unit, it remains under the command of the higher artillery commander, but its fires are not taken away from the supported unit except by the authority of the division or force commander. This authority normally is delegated to the division artillery or force artillery commander.

c. General Support. General support artillery has the mission of supporting the force as a whole. Units with such a mission are held under the command of the artillery commander thus making immediately available to the force commander a reserve of fire with which to influence the action.

d. Reinforcing. A reinforcing mission requires the reinforcing artillery unit to augment the fires of the reinforced artillery unit on call. The reinforced battalion establishes liaison and direct communication with the reinforced unit in order to minimize the time required to answer calls for fire.

e. Modification of Tactical Missions. Tactical missions assigned artillery units may be modified; in which case, the modifications must be clearly stated by the commander assigning the mission. Since a tactical mission of direct support demands the full use of all elements of an artillery unit, it normally should not be modified. Requirements for allocating a portion of the unit's effort, while still retaining control of that unit, may dictate modification of the appropriate mission.

An Arty Bn with a mission of:	Answers calls for fire from:	Establishes liaison:	Establishes communication:	Has the following zone of fire:	Must furnish forward observers:	Displaces when:
DIRECT SUPPORT	Spd unit. Own observers. Next higher hq.	With spd unit down through bn level.	With spd unit.	Z/A spd unit. Additional zones as directed.	For Z/A of each Rifle or Armd Co of spd unit.	Bn Cmdr * deems necessary. Ordered by next higher hq.
GENERAL SUPPORT	Next higher hq. Own observers.	No.	No.	Z/A spd unit.	No.	Ordered by next higher hq.
REINFORCING	Reinforced arty. Own observers.	With reinforced arty.	With reinforced arty.	ZF reinforced arty or as directed.	As requested by reinforced arty.* Ordered by next higher hq.	Requested by reinforced arty.* Ordered by next higher hq.

* Notifies next higher headquarters as to time and area.

Figure 6. Field artillery tactical missions.

60. Assignment of Tactical Missions

- a. The tactical missions for division artillery battalions are assigned by the division artillery commander as approved by the division commander.
- b. The corps artillery commander assigns missions to the corps artillery as approved by the corps commander. Corps artillery units are normally assigned missions of general support or reinforcing.
- c. Army artillery units are normally assigned missions of general support or reinforcing by the army artillery commander, as approved by the army commander.
- d. Corps and army artillery commanders assign tactical missions to groups and to separate battalions retained under corps and army control respectively. Ordinarily, they do not assign tactical missions to the battalions within a group.
- e. A field artillery group commander assigns tactical missions to battalions of the group in accordance with the mission assigned to the group.

61. Zones of Fire

Zones of fire (par. 41) are assigned to artillery units to effect control of fire laterally and in depth to best support the action of the supported unit. Zones of fire are assigned with the tactical mission.

62. Artillery With Reserve Units

a. As a general rule, artillery is not held in reserve, thus organic artillery of a division in reserve may be employed in support of the corps if it can be foreseen that the artillery will be able to rejoin its division when that unit is committed. Such artillery should be employed as general support or reinforcing artillery. Plans for the utilization of the fires of these artillery units should be integrated with the overall artillery fire plan in such a way that the overall plan will not suffer a major disruption upon withdrawal of the reserve division's artillery. Organic artillery units of a reserve division must prepare plans to reassemble their subordinate elements so they can give timely support to the parent division when committed. If practicable, it is preferable to employ the artillery units of such a division as a group. Sufficient members of the artillery staff should be left with the reserve division to insure proper planning, liaison, and reconnaissance for future actions of the division.

b. The principles indicated in *a* above are also applicable to the employment of an artillery battalion which normally supports a specific infantry regiment or other unit, when that regiment is in division reserve.

Section III. OBSERVATION

63. General

Artillery commanders utilize air and ground observation not only as a means of controlling and coordinating supporting fires, but also to collect information of the enemy. Observation provides information for friendly troops. It provides a means of adjusting and performing surveillance of artillery fires and of fires delivered by aircraft and naval guns. Each corps artillery has an organic field artillery observation battalion (par. 88). All echelons of artillery maintain observation throughout daylight and darkness. During darkness, observation is aided by various means of battlefield illumination (par. 66) and electronic devices such as radar (par. 64). Artillery observation should cover the entire zone or sector of the supported unit. It is coordinated by the assignment to artillery units of zones of observation which normally correspond to their assigned zones of fire and by the designation of an O-O line (par. 41). Careful attention must be given to coordination of observation along boundaries between adjacent units to insure complete coverage. For a discussion of artillery observation in air defense, see paragraph 235.

64. Means of Observation

a. *Observation Posts.* Observation posts (OP's) form the framework of ground observation and are important adjuncts to the air warning system (par. 235 and FM 44-8). They are established by artillery observers and surveyors to locate targets, to adjust fires, to provide surveillance of fires, and to maintain observation throughout the zone, including areas defiladed to forward observers. However, observation and adjustment of field artillery fires are not confined to artillery personnel; members of supported units often report the locations of targets and sometimes adjust fire thereon (FM 6-135).

b. *Forward Observation.* Direct support artillery furnishes a forward observer section for each rifle company or similar organization committed to action by the supported unit. Forward observers are principally concerned with the immediate surroundings of the supported company, consequently their observation capabilities are directly related to the company's mission and situation. Although artillery units with a mission of other than direct support may also furnish forward observer sections, these observers function under the control of the artillery liaison officer of the direct support artillery unit, as do that unit's organic forward observers.

c. *Air Observation.* Observers in aircraft are used to supplement ground observation and to exercise general surveillance over the bat-

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tlefield. The aircraft organic to the artillery may be employed under the direction of the commanders of the units to which assigned or control may be centralized, depending upon the situation (FM 20-100). Long-range artillery may require air observation beyond the capabilities of Army aviation, in which case reconnaissance aircraft of the Air Force are available for these missions upon the request of the artillery commander (par. 188). For such artillery adjustment and surveillance missions, definite arrangements concerning communication and technique to be utilized on the mission are made by the artillery unit concerned with the Air Force observer through the corps artillery liaison officer at the reconnaissance wing airfield.

d. Radar Ranging. Field artillery observation batteries (par. 88) and divisional light field artillery battalions (FM 6-101) are equipped with radar sets which under optimum conditions are capable of detecting and locating enemy artillery to an accuracy of 150 yards and mortars to an accuracy of 50 yards at a maximum range of 10,000 yards. Under favorable conditions, artillery radar is capable of registering and adjusting artillery fire. Heavy rain and snow and lack of suitable position areas for the radar sets will reduce the efficiency of radar ranging (FM 6-120). Radar when suitably sited may also be used to detect enemy movements (moving target detection—MTD) (TM 11-462).

e. Sound Ranging. Sound ranging is accomplished for the artillery by the observation battalion (par. 88). Sound ranging normally is capable of determining the locations of sound sources with an accuracy of 50 to 100 yards at ranges up to 15,000 yards. It is most valuable because of its ability to locate artillery weapons which are hidden from visual observation. Sound ranging does not require a clear line of sight to the target, is particularly effective in fog or rain, and falling snow has no effect. High winds impair the accuracy of sound ranging. The maximum range is limited by the intensity of the sound. Infantry sound ranging sets (FM 7-25) are also useful in locating mortars.

f. Flash Ranging. Flash bases are established by the observation battalion (par. 88) and abbreviated (01-02) flash bases may be established by any artillery battalion (FM 6-40). Flash ranging locations are extremely accurate. Under favorable conditions it is the most accurate available means of target location and a valuable source of intelligence. Flash ranging is limited in its effectiveness, however, by unfavorable terrain and weather conditions which impair visibility, and by enemy deceptive measures.

65. Coordination of Observation

Coordination of observation must be a continuous process at all levels of command to insure that complete coverage of the zone of operations is maintained. The S2 at each echelon of artillery command coordinates all of the means of observation available to his commander. The plan of observation, like a fire plan, is built simultaneously at all echelons. Final coordination of observation cannot be effected by the corps artillery S2 until he has the plans of observation of divisions within the corps. Necessary readjustments are made through the normal chain of command.

a. Field Artillery Group. The observation functions of the field artillery group S2 depend upon the tactical mission assigned the group. If the group has a reinforcing mission, the coordination of observation is a responsibility of the reinforced unit; with a general support mission, the overall coordination of observation rests with the S2 of the artillery of the supported force or unit. In either case, the group S2 coordinates the observation facilities under group control, carrying out the overall observation plan. His duties in this respect parallel those of the division artillery S2.

b. Division Artillery. The coordination of observation performed by the division artillery S2 requires analysis of, and the submission of appropriate recommendations concerning present and future observation requirements. Visibility charts of ground OP's and radar sector of scan overlays are studied by the S2 to determine the adequacy of coverage, weaknesses, dead spaces, and the need to augment or relocate observation facilities. He coordinates the observation facilities of the division artillery, as well as those of units reinforcing the division artillery. This coordination may include—

- (1) Instructions concerning the number of observation posts and their general locations.
- (2) Assignment of zones of observation and areas of primary responsibility.
- (3) Employment of organic aviation and that of attached and reinforcing units.
- (4) Employment of radar sections.

c. Corps Artillery. The final coordination of observation is made by the corps artillery S2 who must know the location of all observation posts within the corps zone and what areas can be seen from these observation posts. Coordination in depth when considered necessary, is obtained by designation of an O-O line (par. 41). Particular attention is directed to the areas along the division boundaries. Observers in the zone of one division frequently can see and adjust artillery fire on targets in the zone of another division. Observation

for adjustment or surveillance of fire may be assigned to observers belonging to units other than the artillery units designated to fire. Organic army aviation is employed to supplement ground observation (par. 64). While the technique of setting up flash, radar, and sound installations is left to the observation battalion, its attention should be directed into those areas deemed most likely to contain enemy artillery.

66. Battlefield Illumination

Illumination of the battlefield is a supporting mission and is a responsibility of the artillery. Such means as illuminating shells, aircraft flares, and field artillery searchlights are used for illuminating the battlefield to facilitate night observation and provide assistance to infantry and armored units' night operations. Paragraph 87 discusses the field artillery searchlight battery. For additional information on means and methods of illumination, see FM 6-40 and SR 310-20-3.

Section IV. SURVEY

67. General

Artillery survey is the process of determining the relative horizontal and vertical locations of artillery weapons, targets, and target locating devices and providing means of orienting weapons and equipment on the ground. Survey facilitates the massing of fires, the delivery of surprise observed fires, and the delivery of effective unobserved fires. Survey must be performed with appropriate accuracy and should be based upon a carefully prepared plan with definite goals and priorities. The senior artillery commander is responsible for initiating the overall survey plan, establishing common control, disseminating survey information, and determining the accuracy of available maps. Commanders must allow for the time required for survey if support by accurate unobserved fire is expected. The time required depends upon the type of map or chart and control available, weather, enemy activity, and terrain.

68. Control

Common control is that control used by a unit as a whole; it may be either assumed control or true control, depending on the origin of the common grid.

a. Assumed control is survey based on an arbitrary altitude and grid reference for the starting point and an assumed or true direction. It should closely approximate true control in direction and altitude to permit use with metro data.

b. True control is control that has been tied into the survey system (military grid) being used. These data are procured by artillery survey personnel from topographic engineers, existing maps, trig lists, or other lists of existing control.

69. Echelons of Survey

The higher echelon is responsible for carrying survey control to the lower unit. However, survey is performed simultaneously in all echelons. Lower units commence survey from control points when these have been furnished by higher headquarters. When no control is available, survey is initiated based on assumed control and converted to true control when it is made available.

a. *Field Artillery Group.* The group does not perform survey. The group commander may assist his battalions in survey activities by procuring and furnishing survey data and by coordinating survey plans. Each battalion of the group ties its survey into the common control furnished by the artillery headquarters with which the group is working.

b. *Division Artillery.* Division artillery extends corps survey control to each battalion of the division artillery when such control has been furnished. In the absence of corps control, division artillery extends common control to each of its battalions, tying in to corps control when it becomes available. Division artillery establishes a survey information center (SIC) that serves the same purpose as the corps survey information center (*c* below).

c. *Corps Artillery.* The corps artillery survey officer is the observation battalion (par. 88) commander. The observation battalion normally furnishes common control to the field artillery units of the corps. Where true control is available, the observation battalion connects the corps survey to true control and makes the necessary conversion to place the entire corps on true control. The observation battalion, in addition to extending common control to artillery units with the corps, executes its own internal survey, and establishes a survey information center to maintain a record of all survey control available in the corps sector. All requests for control should be made to the SIC and all survey data determined by units with the corps should be reported to it.

d. *Army Artillery.* Army artillery units, except as noted in *e* below, perform their own survey operations. This survey is tied in to true control which may be obtained from army topographic engineers, a corps artillery, or available maps, trig lists, or other lists of existing control. Units requiring survey of a higher order of accuracy than that furnished by a corps observation battalion are equipped with the necessary means for executing survey operations peculiar to their own

requirements. Corps of Engineers are responsible for furnishing maps and map sheet correction data for use by long range artillery, for common control between the artillery position area, and the target area.

e. Antiaircraft Artillery Units. When an antiaircraft artillery unit operates under a surface mission, it will perform the usual battalion survey operations. When assigned an air defense mission, but in position to augment the fire of a field artillery unit, the antiaircraft artillery unit will use survey data supplied by the field artillery unit.

Section V. MANEUVER OF FIELD ARTILLERY UNITS

70. General

This section discusses the movement of artillery *units* as opposed to the maneuvering of artillery *fires* which is discussed in chapter 13. The artillery commander is responsible that his units are so maneuvered that they are able to render effective support in all situations. This requires—

- a. That the artillery's characteristic of mobility be zealously maintained (par. 71).
- b. That all artillery commanders keep abreast of plans of the supported units (pars. 36 and 37) and anticipate requirements for artillery (par. 44).
- c. Proper organization for combat, necessary changes thereto during the operation, and decentralization of control when appropriate (pars. 56-62).
- d. Coordinated movement of artillery units and proper employment of artillery during marches and with security detachments (pars. 72 and 73).
- e. Selection of position areas from which effective artillery fire can be delivered (par. 74).
- f. Continuing reconnaissance for position areas, observation posts, locations for other installations, and routes (par. 75).
- g. Timely displacement of artillery units to provide continuity of fire support (par. 76).
- h. Sound procedures in effecting relief of artillery units in combat (par. 77) and in the reception of attached artillery (par. 78).
- i. Effective security measures (par. 79).

71. Mobility

- a. Mobility is a prime requisite of field artillery units. It is obtained by applying an effective system of maintenance and operation to the unit's organic transport (FM 6-101, FM 6-110, and FM 25-10).

b. The commander of each echelon of artillery is responsible for the operation and maintenance of the transport of his unit. The prescribed standards of vehicle operation and maintenance can be maintained only by close supervision. The execution of this function may be delegated to the motor officer but the responsibility remains wholly that of the commander.

72. Movements

a. *References.* For the basic doctrine governing troop movements, see FM 100-5; for technical and logistical data, FM 101-10; for march orders and march tables, FM 101-5; for detailed treatment of motor movements, FM 25-10; for details of marches of field artillery battalions, FM 6-101; and for a discussion of antiaircraft protection, FM 44-2 and FM 44-4.

b. *Tactical Marches.* When a force is marching in multiple march columns, artillery is placed within each column to insure its availability for early and adequate support of the security forces and of the initial action of the main body. Artillery in each march column is attached to the column commander; command reverts to the force artillery commander when control can be effectively centralized. This is accomplished upon order of the force commander. Artillery reconnaissance, survey, observation, and liaison personnel march with forward elements of the column. When the rate of march of the column is that of dismounted troops, the artillery marches by bounds.

c. *Antiaircraft Protection.* The march column requires continuous antiaircraft protection. This protection is obtained by dispersing self-propelled light antiaircraft artillery fire units throughout the column within mutually supporting distance of each other and by having the organic antiaircraft weapons of the units ready for immediate employment.

73. Artillery With Security Forces

A military force in movement secures itself by reconnaissance elements (covering forces) operating in front of the command and by advance, rear, and flank guards when appropriate (FM 100-5). Self-propelled artillery is desirable for the support of all security forces.

a. *Covering Forces.* Covering forces should be strong in artillery. When not organic to the covering force, artillery units usually are attached to it. For the artillery to occupy positions promptly to support the action, planning and reconnaissance must be continuous. The artillery is located in the column so that it can enter action promptly and so that other elements of the covering force can protect it from surprise attacks. Survey and communication are abbreviated to accelerate opening of fire.

b. Advance Guard. Artillery support for the advance guard (FM 6-101) is furnished by the attachment of an artillery unit to, or by artillery marching with, the advance guard. If the advance guard is small and within range, artillery support may be furnished by artillery with the main body. The amount of artillery attached depends upon the size of the advance guard and expected enemy action. The location of the artillery and the performance of reconnaissance is similar to that for covering forces. Speed in the occupation of position and in the attack of targets is essential. When contact is imminent, the artillery supporting the advance guard moves by bounds from one firing position to another.

c. Rear Guard. The mission of the rear guard requires the support of light and medium artillery and sometimes long-range heavy artillery. Artillery with the rear guard is usually attached. The employment of the artillery is similar to that with the advance guard. The artillery occupies positions close behind each of the successive rear guard positions. Fire is opened at long range to force the enemy to deploy and thus to delay his advance. Roads, road junctions, and key terrain features are taken under interdiction fire. Some of the artillery is displaced early to give continuity of fire and to support the withdrawal of the rear guard to its new position. When the distance from the enemy permits, the rear guard retires in march formation.

d. Flank Guard. Artillery support for the flank guard is usually furnished by artillery with the main body. However, if the size of the flank guard is large and is operating at considerable distance from the main body, artillery is attached to it. The employment of artillery thus attached to the flank guard is similar to that with the advance guard.

74. Position Areas

a. General. The location of artillery position areas is governed mainly by the terrain and the nature of the tactical operation. Artillery commanders may have to delineate areas for the location of the major elements of their commands in order to coordinate the position areas with operations near the front. Usually, direct support artillery has priority for positions within the division area and division artillery battalions have priority over corps artillery units for positions within the corps area. Special requirements may necessitate special priorities. For a discussion of field artillery battery and battalion position areas, see FM 6-101.

b. Responsibility. Direct support battalion commanders normally select their own position areas subject to approval of the next higher headquarters. Position areas for general support units are selected

(par. 75) by the force artillery commander and may be selected for reinforcing artillery units by either the force artillery commander or by the commander of the reinforced unit. Corps and army artillery position areas within the division area are coordinated with the division artillery commander concerned; army artillery position areas within the corps area are coordinated with the corps artillery commander concerned. Artillery commanders coordinate the selection of positions for both field and antiaircraft artillery units. All artillery commanders should be aggressive in search for position areas and be ready to make recommendations to commander responsible for selection.

75. Reconnaissance

Reconnaissance is a directed effort in the field by military units to gather information of the enemy, weather, and terrain. Artillery reconnaissance consists of target reconnaissance, which is a part of target intelligence (ch. 10), reconnaissance for positions, and route reconnaissance. Reconnaissance for positions involves a search for all appropriate locations for artillery installations such as gun positions, command posts, and observation posts. Route reconnaissance is made prior to any movement of artillery units and involves a search for all potential displacement routes. Artillery reconnaissance is active and continuous. It is planned with a definite object in view and is centralized when time is short.

a. Responsibility. Artillery commanders at all echelons, regardless of their assigned tactical mission, are responsible for performing continuous route and position area reconnaissance and for making recommendations pertinent thereto. Reconnaissance personnel must determine what information is desired and carefully plan their activities so that reconnaissance may be completed in time for the information to be of use. Air observers, liaison officers, forward observers, communication personnel, and survey parties habitually report on routes within the zone of advance.

b. Reconnaissance Means. Artillery commanders use every means at their disposal to secure the information they need. Liaison with other units often precludes the necessity for lengthy reconnaissance. Reconnaissance may be performed by any of the following means or combination thereof.

1. *Maps.* Position area and route reconnaissance are initiated by the use of maps. Map studies are particularly valuable in planning a reconnaissance but can seldom be used as the only source of information.

- (2) *Aerial photographs.* These may be used in the same manner as maps for position area and route reconnaissance. Recent aerial photographs indicate current terrain conditions.
- (3) *Air.* Aerial reconnaissance may be performed by Army aviation or by Air Force or Navy reconnaissance support. Organic aircraft, particularly the rotary-wing types, are especially valuable aids to reconnaissance. A map or map substitute reconnaissance should precede reconnaissance by air.
- (4) *Ground.* Ground reconnaissance is performed by all commanders, their staffs, and observation and reconnaissance personnel. A ground reconnaissance should be made of position areas prior to occupation and of routes prior to their use. Ground reconnaissance is preceded by a map study and is so organized that it may be performed in the minimum time.

c. *Reconnaissance by Echelon.* Each echelon must execute reconnaissance to obtain information pertinent to the employment of units of that echelon. Reconnaissance is coordinated between artillery echelons by the senior artillery commander concerned.

- (1) *Field artillery group.* Field artillery groups perform necessary reconnaissance to select position areas for their battalions and command installations after a general position area and mission have been assigned by higher headquarters. When applicable, the reconnaissance is coordinated with the unit whose fires the group is reinforcing. Group also performs necessary route reconnaissance for movement of the group.
- (2) *Division artillery.* Division artillery selects position areas and routes for movement of subordinate general support units, for units reinforcing the division artillery, and may select them for direct support units. Direct support artillery commanders are responsible for performing their own position area and route reconnaissance. Position areas and routes so selected are reported to division artillery. Although position areas and routes of movement for subordinate general support units are selected by division artillery, general support battalion commanders are also responsible for performing continuous position area and route reconnaissance in order to facilitate displacement when ordered by division artillery. Division artillery also performs extensive target reconnaissance (ch. 10).

- (3) *Corps artillery.* Corps artillery directs continuous and aggressive target reconnaissance (ch. 10). Normally, corps artillery headquarters assigns general position areas and routes to groups and separate battalions based, whenever possible, upon preliminary ground reconnaissance and a study of maps and fire capabilities. Necessary additional reconnaissance is left to group and battalion commanders.
- (4) *Army artillery.* Army artillery performs such reconnaissance as is necessary for the employment of artillery units retained under army control.

76. Displacements

Timely and rapid displacements of field artillery units are necessary to provide continuity of fire support. Fire support is maintained during displacements by displacing units by echelon or by using other artillery units to answer calls for fire. Displacements are accomplished as rapidly as possible so that fire can be resumed with a minimum of delay and to lessen the probability of the displacing unit's detection and attack by the enemy. Command posts are displaced by echelon to insure continuity of control. Communication nets are installed and operations begun at the new command post location prior to displacement of the old command post. Prior to the beginning of an action, units may displace to positions during darkness to avoid detection by the enemy. Thereafter displacements are made depending upon the progress of the supported unit, difficulty in maintaining communication, and the nature of the terrain. Normally field artillery units displace at least half of their effective range although many considerations such as the immediate situation, overall plan of operation, terrain, and availability of position areas and routes will influence each displacement. All artillery commanders are responsible for continuous reconnaissance for position areas and routes, for keeping themselves abreast of the situation, and for making recommendations to the appropriate headquarters when displacement becomes necessary. As shown in figure 6, authority for displacement of field artillery units is dependent upon the tactical mission assigned the unit.

77. Relief in Combat

a. *General.* Relief in combat is of two general types: relief in place, and passage of lines (FM 100-5). Neither type of relief presents any serious difficulties for the artillery. If the relieving artillery is to occupy positions other than those of the artillery being relieved, the relief is accomplished in a manner similar to that used during reinforcement in combat (par. 78). If the relieving artillery

is to occupy the positions of the artillery being relieved, the relief entails more detailed planning and cooperation between incoming and outgoing artillery units. During the course of the relief, the artillery maintains its normal fires and is prepared to execute counterbattery and protective fires along the front of the relief in the event of an attack by the enemy. Relief is made at night, when possible, to maintain secrecy.

b. Warning Orders. When a relief in place or a passage of lines is to be made, warning orders are issued by the commanders of the next higher headquarters, the relieving unit, and the relieved unit. Warning orders should include the hour the movement for the relief is to begin and end, the zone of operation of the relieving unit, and any restrictions imposed upon reconnaissance parties.

c. Reconnaissance. Prior reconnaissance and consultation on details are necessary, but may be limited by the amount of time available. Time permitting, the relieving unit commander, staff, and subordinate commanders should make personal reconnaissance and confer with their opposite members of the relieved unit in order to reach agreement on details of the relief.

d. Responsibilities. The unit being relieved is responsible for furnishing the relieving unit with such of the following as are applicable:

- (1) Friendly situation including location of units and installations, no-fire line, 0-0 line, and OP's.
- (2) All available information of the enemy.
- (3) Information on routes and road guides, if necessary.
- (4) Survey information.
- (5) Location of supply installations.
- (6) Location of other artillery units within supporting range and means of communicating with them.
- (7) Any restrictions on firing or movement.
- (8) Existing wire circuits and wire line route maps.
- (9) Information necessary for fire control including fire plans, situation maps, and other information pertaining to operations in that area.
- (10) Authorized ammunition in excess of basic load or other allowance (applicable only to relief in place).
- (11) Any other information which may be pertinent.

e. Command.

- (1) *The principle of one responsible commander must be adhered to during the execution of a relief in place (FM 100-5).* When the artillery and the supported unit are being relieved during the same period, the artillery command passes from the relieved artillery commander to the relieving artillery

commander simultaneously with the passage of command from the relieved supported unit commander to the relieving supported unit commander (FM 6-101). When the artillery and the supported unit are being relieved at separate times, the artillery command passes from the relieved artillery commander to the relieving artillery commander upon the direction of higher headquarters.

(2) When a relief by passage of the lines occurs, the incoming artillery commander usually becomes responsible for the artillery support prior to the beginning of the operation. This may be achieved by attaching the outgoing artillery to him or by assigning the outgoing artillery a mission of reinforcing him. In any event, the outgoing artillery supports the passage of lines from its original positions only until such time as the relieving supported unit passes beyond its range, then its status of attachment or mission of reinforcement normally ceases.

78. Reception of Attached Artillery

a. *General.* The presence of additional artillery on a battlefield may be an index of more active operations. Artillery supporting a battlefield should be moved up at night whenever practicable and with utmost secrecy.

b. *Attachment to Headquarters Higher Than Battalion.* Artillery units of battalion, group, or division artillery size may be attached to other artillery headquarters. The attached units are given orders which, similar to those that are given to organic battalions, state their mission, position areas, and routes.

c. *Attachment to Organic Battalion.* When another artillery battalion is attached to an organic battalion, the commander of the organic unit is designated as the battalion-group commander (par. 17). He is responsible that complete preparations are made for the reception of the attached battalion. As a minimum, the battalion-group commander's responsibility for the attached battalion includes—

- (1) Selection of position area.
- (2) Designation of route into position and time of occupation.
- (3) Furnishing survey information.
- (4) Administrative support.
- (5) Communication arrangements between battalions.
- (6) Furnishing information concerning—
 - (a) Enemy and friendly situation.
 - (b) Fire direction SOP's, firing, and other special instructions concerning fire direction.

- (c) Communication.
- (d) Ammunition.

(7) Instructions for liaison and observation requirements.

79. Security

a. *General.* Imagination and resourcefulness in the employment of security measures is necessary to maintain effective artillery fire against an enemy strong in artillery and tactical air or skilled in infiltration and guerilla tactics. Successful deception contributes to effective security. Deceiving the enemy as to the amount of friendly artillery assists the command in obtaining surprise in launching an attack. For active and passive defensive measures of the artillery battalion and batteries in position and on the march, see FM 6-101 and FM 6-140.

b. *Movements.* Secrecy in moving artillery units into position may be gained by night marches and by infiltration. Detailed staff planning and coordination are necessary to avoid confusion and delays.

c. *Deceptive Measures.* Any deceptive measures employed by lower commanders must conform to the mission and counterintelligence plan of the higher commander.

- (1) Dummy positions are employed to deceive the enemy as to the true location of artillery units. These positions are constructed to appear as realistic as possible. Logs, captured weapons, and pneumatic devices may be used to simulate artillery positions. The appearance of digging, vehicle tracks in and around the position, actual and simulated firing, add to realism. Dummy positions should be located so that resulting enemy fire will not damage friendly installations.
- (2) There are many other deceptive measures that may be taken. Artillery may occupy temporary positions and fire from them for short periods of time before moving back to the primary position. The firing of roving guns from surveyed positions for registration purposes and for harassing and interdiction missions is effective. Simultaneous firing by many units makes it difficult for the enemy to locate individual positions. The curtailment of fires, elimination of artillery preparations prior to attacks, restrictions on registrations, and the imposition of radio silence or other restrictions on radio operation, all help conceal the presence of artillery in a given area.

Security Information

Section VI. AUXILIARY WEAPONS

80. General

a. When directed by the appropriate commander, the fires of auxiliary weapons are used to supplement the fires of field artillery units. Examples of auxiliary weapons suitable for use in the field artillery role are tanks, medium and heavy antiaircraft artillery guns, heavy mortars, and armored landing vehicles such as the LVT (A). For maximum effect, such units when employed in a field artillery role, should be capable of employing massed fire techniques and should be connected to the field artillery by survey, liaison, and communication.

b. The employment of auxiliary weapons is facilitated by assigning to them missions of reinforcing field artillery battalions where the means for assisting the reinforcing units are readily available. Since antiaircraft gun battalions are trained and equipped to function as field artillery they may also be assigned general support missions (pars. 59 and 106).

c. The commander of the reinforced artillery unit is responsible for the coordination and employment of all available resources of both the reinforced and the reinforcing unit to the extent that the reinforcing unit may be able to accomplish its mission in an auxiliary role. This may entail assistance to the reinforcing unit in any or all of the following:

- (1) Designating general position areas.
- (2) Furnishing air observation and supplementing ground observation as required.
- (3) Furnishing necessary survey.
- (4) Assigning missions and preparing firing data when applicable.
- (5) Providing communication for the reinforcing unit, if necessary.
- (6) Assisting with refresher field artillery training.

d. The reinforcing unit will usually be responsible for the following:

- (1) Establishing communication.
- (2) Procuring ammunition and supplies.
- (3) Establishing liaison with the reinforced artillery unit.
- (4) Furnishing forward observers as requested by the reinforced unit.

81. Tanks

Tank units with a mission of reinforcing the fires of field artillery normally remain under the command of the unit to which they are assigned or attached. When employed in field artillery roles they are

assigned fire missions suitable for the flat trajectory weapon with which they are armed.

82. Antiaircraft Artillery

For details on the employment of antiaircraft artillery in a field artillery role, see chapter 6.

83. Mortars

When heavy mortar units are designated to reinforce the fires of the field artillery battalion, their employment is similar to that of reinforcing artillery. Special consideration is given to their high rate of fire. In the selection of positions, the range limitations of the mortars and their ability to deliver high-angle fire must be considered.

84. Armored Amphibians, LVT (A)

The armored amphibian (LVT (A)) is a landing vehicle armed with either a 75-mm or 105-mm howitzer. Although designed for close support of a landing force, it can also function as field artillery. When employed as field artillery, LVT (A) units may be either attached to a field artillery battalion or given a reinforcing mission.

85. Howitzer Companies

Each battalion of the armored cavalry regiment (light) has an organic howitzer company which in composition and equipment is identical to the firing batteries of 105-mm howitzer self-propelled battalions. Although this company will seldom be available to the artillery, it may, on occasion, be used to supplement field artillery fires. Improvisation is necessary if it is desired to employ the three howitzer companies of the armored cavalry regiment (light) as a field artillery battalion since they are not organized to function together as an artillery battalion.

Section VII. FACTORS AFFECTING THE EMPLOYMENT OF CERTAIN TYPES OF ARTILLERY UNITS

86. General

Not all field artillery units are employed in the same manner. These differences are due to such factors as the tasks that certain units were designed to perform and the type of equipment used in some units. The following paragraphs discuss the employment of these units.

87. Field Artillery Searchlight Battery

a. Characteristics. The field artillery searchlight battery is assigned to corps artillery and is organized so that it may be attached

to division either as a battery or by platoon, depending upon the illumination requirement. In addition to the normal headquarters, administrative, and maintenance elements, the searchlight battery contains three platoons of six 60-inch searchlights each. This battery has no liaison section and only limited facilities for survey, communication, and security. Therefore, existing artillery facilities are used by the searchlight battery as far as possible and higher and adjacent artillery units may expect to receive requests from searchlight units for additional assistance.

b. Command. The searchlight battery commander acts as the searchlight advisor to the corps artillery commander who in turn advises the corps commander in the use of searchlights, units to be supported, areas to be covered, times of employment, and other matters pertaining to the overall illumination plan. When a searchlight platoon or the entire battery is attached to a division, the searchlight unit commander acts as the searchlight advisor for the division artillery commander.

c. Planning. Effective employment of searchlights for battlefield illumination is dependent upon thorough and coordinated planning. Commanders of supported units consider illumination capabilities in planning night operations and the illumination plan is integrated into the fire support plan. Illumination plans must be formulated early enough to permit daylight reconnaissance for searchlight positions, installation of an adequate communication network, and survey control where applicable. The development of the illumination plan parallels fire planning (ch. 12) and is accomplished by the artillery forward observers, liaison officers, direct support battalion commanders, and division artillery commander in coordination with the corresponding supported commander at each echelon. Final coordination of the illumination plan is accomplished at corps artillery to insure integration of searchlight illumination with fire support means (e. g., target marking) and with other means of illumination (e. g., illuminating shell and aircraft flares).

d. Employment.

- (1) A searchlight battery may be assigned the tactical mission of general support; it may be attached to a subordinate unit; or it may be given a special assignment.
 - (a) For a discussion of the tactical mission of general support, see paragraph 59.
 - (b) When attached (par. 58) to a division a searchlight unit is usually reattached to a direct support artillery battalion. Normally, one searchlight platoon is sufficient to illuminate the sector or zone of action of a regiment; attachment of a platoon to the appropriate direct support artillery bat-

talion therefore permits utilization of such existing artillery facilities as liaison and communication.

- (c) Elements of a searchlight battery may be attached to an appropriate headquarters for special tasks, such as illumination of a construction site.
- (2) Position area requirements for indirect illumination by searchlights are similar to those for artillery. For direct illumination, the positions are selected to give line of sight coverage of the target area and are sufficiently close to the target area to permit complete coverage by the searchlights employed. Position areas are coordinated by the corps artillery commander or, when searchlights are employed in support of a division, by the division artillery commander. Indirect illumination (artificial moonlight), is achieved by diffusion of the searchlight beam (fig. 7) or by reflection from cloud cover (fig. 8). Satisfactory reflection is gained with as little as 60 percent cloud cover. Reflection produces more illumination than does diffusion; with low hanging cloud cover, the illumination is nearly equivalent to that of a full moon. Direct illumination (fig. 9) is a special purpose use of searchlights which produces maximum illumination of targets. Searchlights may also be used to illuminate job sites and to serve as a homing beacon for army aircraft. Illumination by searchlights is affected by atmospheric conditions: dense fog, heavy snowfall, or heavy rain render the illumination totally ineffective. Natural moonlight decreases the effectiveness of illumination as does rough mountainous terrain.

88. The Field Artillery Observation Battalion

a. One observation battalion, consisting of a headquarters and headquarters battery, three identical observation batteries, and a medical detachment is organic to each corps artillery. Headquarters battery has personnel and equipment for survey and meteorological operations. Each observation battery has the necessary survey, flash ranging, sound ranging, and radar ranging equipment and personnel to operate independently of the battalion.

b. Six missions are performed by the observation battalion. They are—

- (1) The location of hostile artillery.
- (2) Registering and adjusting fire of friendly artillery.
- (3) Conduct and coordination of corps artillery survey operations.

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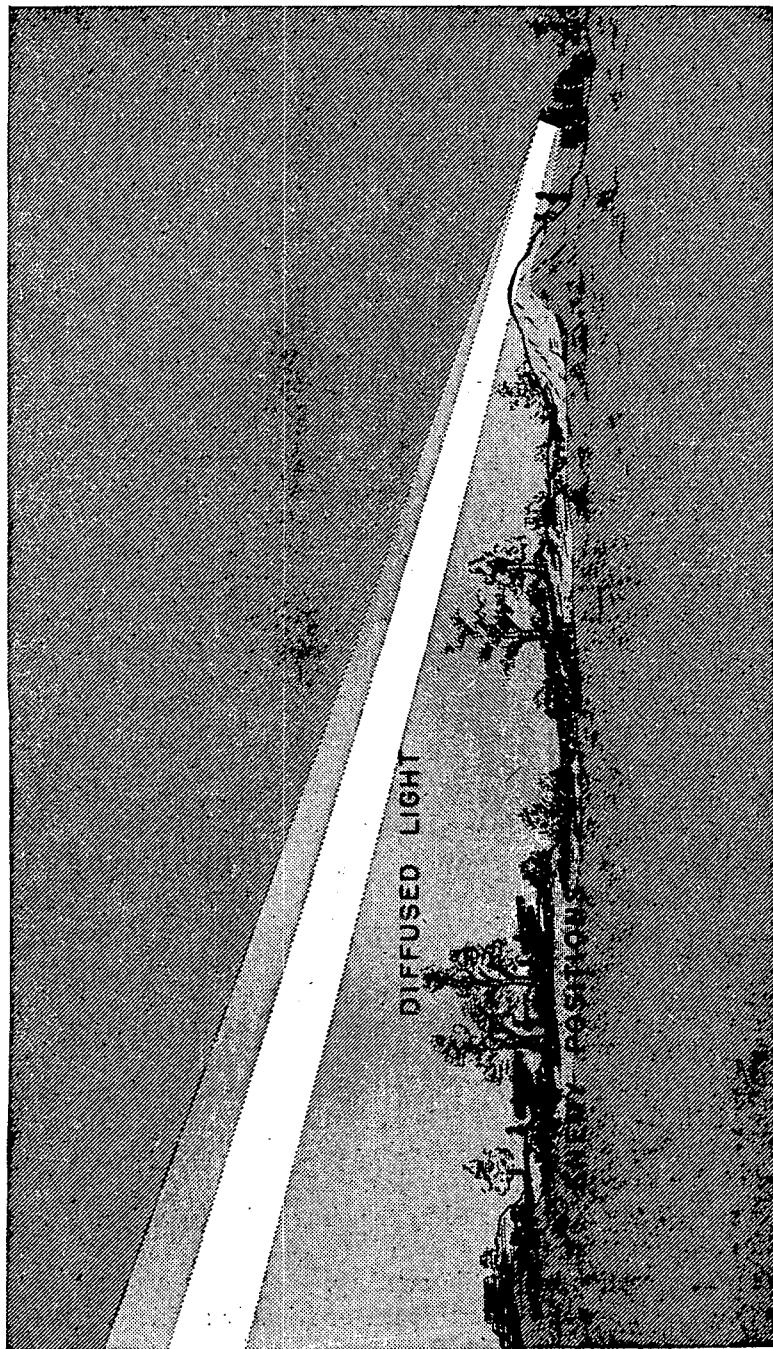


Figure 7. Illumination by diffusion.

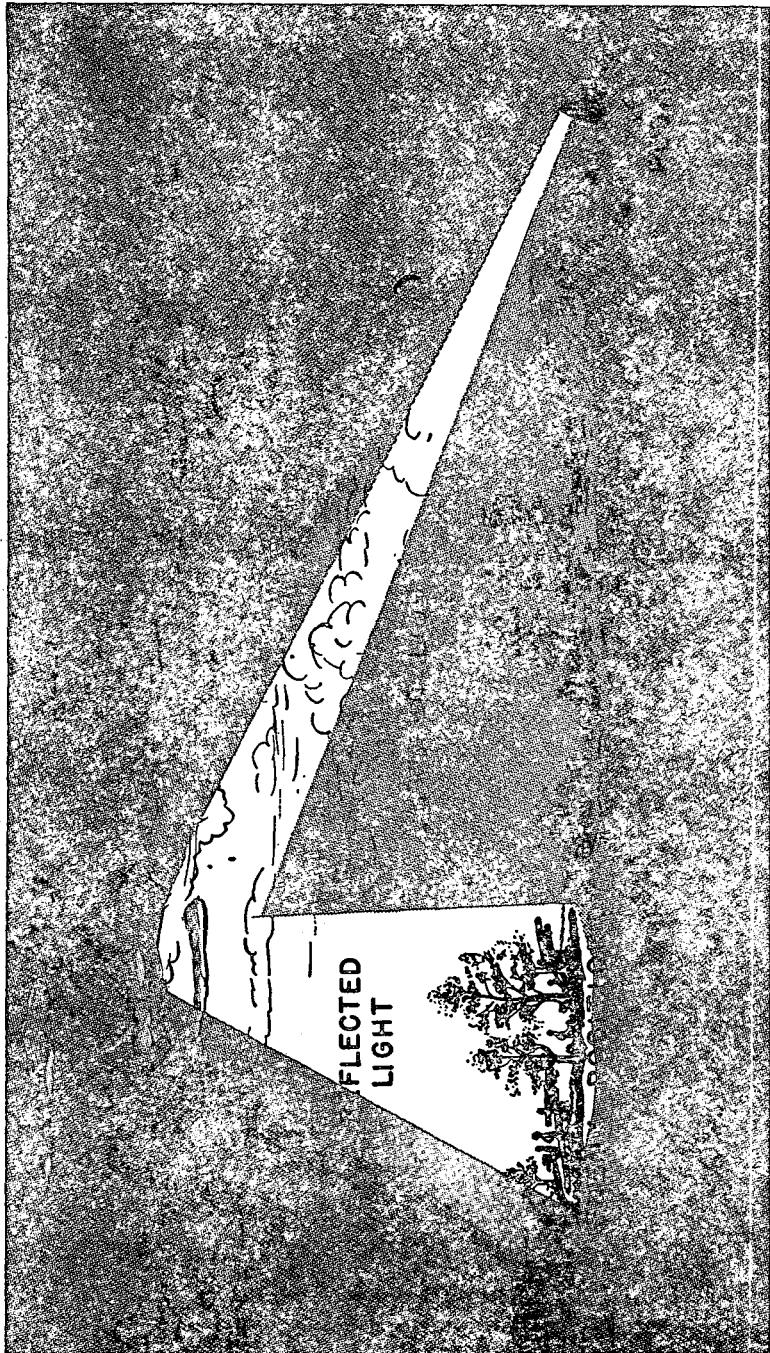


Figure 8. Illumination by reflection.

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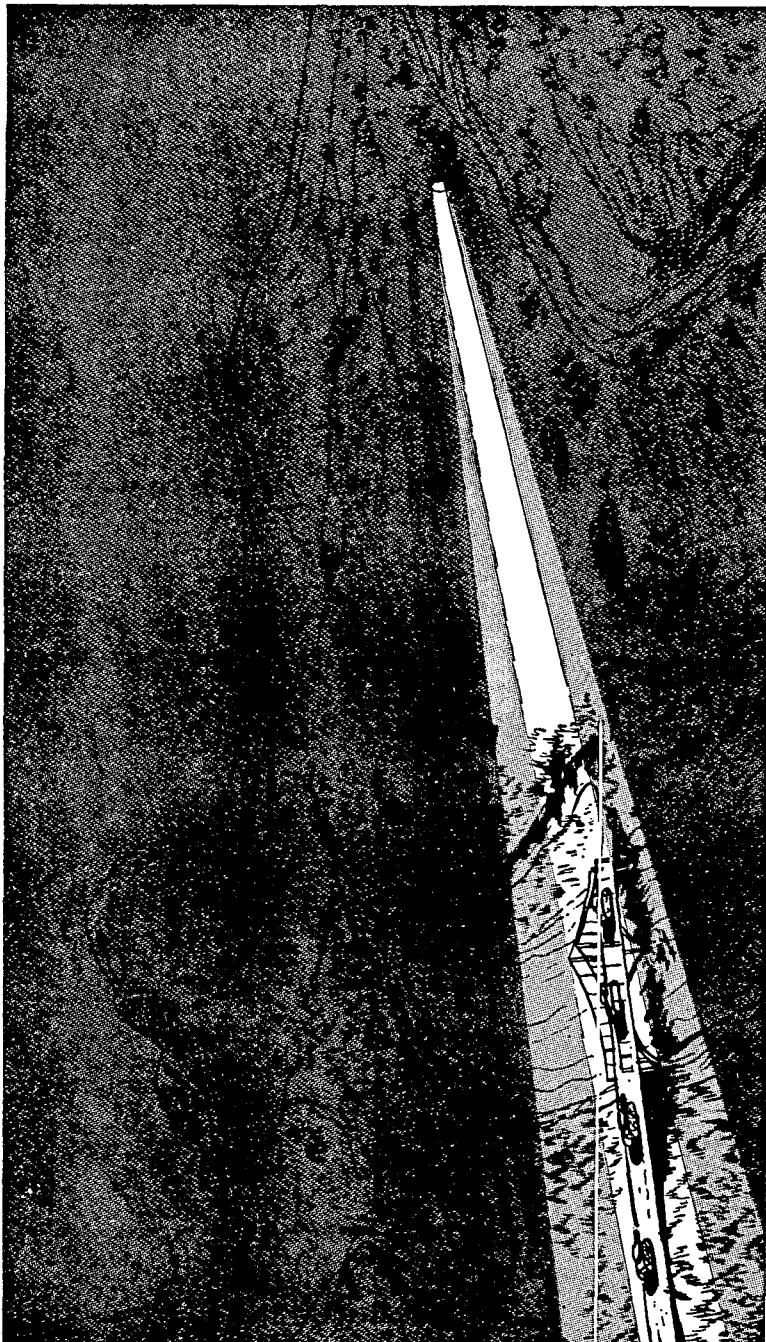


Figure 9. Direct illumination.

- (4) Collecting and reporting combat information.
- (5) Comparative calibration of friendly artillery.
- (6) Providing meteorological data to artillery units.

e. Technical considerations involved in the employment of observation units should be left to the unit commander who advises higher headquarters on the capabilities and limitations of his unit under existing conditions. The battalion operates more efficiently under centralized control and therefore is usually assigned the tactical mission of general support. When centralized control is not feasible, the batteries may be attached to divisions or task forces. For capabilities and limitations of the observation battalion and batteries, see FM 6-120.

89. The 280-mm Gun Battalion

The 280-mm gun is a long-range field artillery weapon possessing considerable mobility and capable of neutralizing and destroying targets over a wide area by accurately delivering atomic as well as high explosive projectiles. Normally, these very heavy cannon units are attached to corps, assigned a mission of general support, and emplaced beyond the range of the enemy's light and medium artillery. The 280-mm gun as an exception to the general rule, may as a security measure be held in reserve until such time as the attack of a suitable target(s) can be achieved with maximum surprise. For further references concerning the employment of the 280-mm gun and its support by ordnance units, see SR 810-20 series.

90. Field Artillery 4.5-Inch Rocket Battalion

a. *Characteristics.* Field artillery 4.5-inch rocket battalions are normally attached to corps and may be further attached to divisions in whole or by batteries. Their organization is designed to facilitate the attachment of a platoon or battery to combat teams or commands for special operations. Each rocket battery consists of two platoons containing six launchers each. The rocket launcher is an area saturation weapon to be used on targets in known locations where surprise fire in great volume is indicated. It is an excellent weapon with which to saturate an area with a blanket of fire. Dispersion of 4.5-inch rocket fire makes it unsuitable for attack of point targets, precludes using it for targets close to friendly groups, and makes precision registration impracticable (FM 6-40). Flash and blast of the burning propellant make it difficult to conceal launcher positions thereby necessitating positions in defilade; on hard, damp, or grass-covered soil. Also, neutralization of enemy observation by smoke or fire may be indicated. The fact that rocket launchers usually disclose their posi-

tion when fired may require immediate displacement to avoid enemy counterfire.

b. Missions. Standard field artillery tactical missions *except direct support* may be assigned to the rocket battalion. Normally the rocket battalion is retained under corps artillery control until it is selected for a specific mission. Then it may be attached to a group or division artillery for this mission. Flexibility of organization permits breaking down the battalion into six platoons each capable of operating separately. When decentralized in this manner, special consideration by the force commander must be given to supply (especially ammunition) and administrative control.

c. Employment.

- (1) In combat, 4.5-inch rocket artillery is most effective when used in mass to obtain heavy, intensive, surprise fire. The maximum effect is obtained by centralized control.
- (2) In defensive combat, platoons or batteries may be attached to other artillery units in order to cover the widest possible front.

91. Field Artillery Guided Missiles and Very Heavy Rockets

a. General. Field artillery guided missile battalions and very heavy rocket units are normally assigned to army (par. 12). They are capable of delivering atomic, radiological, biological, chemical, and high explosive warheads at long ranges under all weather conditions.

b. Missions. Battalions and batteries of this type are normally assigned a general support mission. When the situation warrants, they may be used in support of a division. These weapons are used to augment other fire support means.

c. Special Considerations. Position areas containing guided missiles and very heavy rockets will be high priority targets for enemy action, consequently, security is of prime importance. Normally position areas are selected that are beyond the range of the enemy's light and medium artillery. Alternate positions must be selected and prepared. The requirement for a comparatively large position area for guided missiles presents a special consideration. In determining weight capacities of bridges and roads to insure passage of these units' heavy equipment, engineer assistance may be required. The employment of these weapons is limited by the following factors—

- (1) The rate of fire is significantly lower than for other artillery weapons.
- (2) Ammunition resupply is more difficult because of size and weight of ammunition.

- (3) A higher order of survey is required for these units than is required for other artillery units.
- (4) The mobility of these units is limited by their size, weight, and equipment.
- (5) When missiles with atomic warheads are employed, the efficiency of employment is dependent upon a high degree of preplanning and closely supervised coordination of all agencies concerned. The delivery of warhead components, calculation of firing data, setting of data on the missile and guidance equipment, and missile checkout must be accomplished within required tactical time limits.

d. Suitable Targets. All large area targets are suitable for attack by heavy rockets or field artillery guided missiles. The characteristics of the carriers and the multiplicity of warheads designed for them allows the commander to employ them for close support missions, for harassing missions, for counterbattery, for attack of installations beyond the range of conventional artillery and for area denial missions. The cost of these weapons is high. Before utilizing the very heavy rockets or field artillery guided missiles, commanders should consider carefully whether a proposed mission can be accomplished by less expensive means.

Section VIII. EMPLOYMENT OF ARTILLERY ARMY AVIATION

92. Organization

Army aviation, organic to artillery units, is utilized to expedite and improve ground combat and logistical procedures. For a detailed discussion of army aviation, see FM 20-100.

a. Army aviation sections within the artillery are organic to the headquarters and headquarters batteries of the following units:

- (1) Corps artillery.
- (2) Field artillery group.
- (3) Division artillery.
- (4) Field artillery battalions except observation battalions, 4.5-inch rocket battalions, guided missile and very heavy rocket battalions.

b. The sections are composed of aviators, aircraft mechanics, aircraft, and the necessary equipment to operate as an integral part of the unit. In addition, aerial observers are provided as augmentation when authorized by the theater of operations commander.

c. In addition to supervising the unit aviation section, the unit aviation officer advises the commander concerning the utilization and employment of army aircraft with the command.

93. Capabilities

Army aviation may be utilized to perform numerous observation and administrative tasks, such as battlefield surveillance, conduct of fire, reconnaissance, column control, and courier service. In addition, when provided with special equipment or when the aircraft is appropriately modified, army aviation may perform a variety of special missions including photography, battlefield illumination, wire laying, medical evacuation, and assist in survey.

94. Employment

a. Employment of army aviation by artillery is determined by the mission of the unit and the current situation. Normally each unit commander controls his organic aviation section. It is essential that he have complete control of his aircraft when participating in an independent action or when the situation is changing rapidly.

b. Scheduling the surveillance missions of subordinate unit aviation sections is the most efficient method of providing continuous daylight observation of the battlefield. This type of operation results in economy of means and is generally employed during a stable situation, during a build-up in strength, when units are being relieved, or because of administrative requirements.

c. Employment of army aviation for night surveillance involves additional hazards due to the lack of visual reference points for aerial navigation. The performance of night surveillance requires a means of lighting or marking the airfield.

95. Airfields

The type of airfield used will depend primarily on the tactical situation and the availability of suitable areas. Landing areas must be free of obstacles and must provide sufficient length and hard surface for the operation of the aircraft. Airfields may be either unit airfields that are used by a single unit or common airfields that are used by two or more units.

CHAPTER 6

TACTICAL EMPLOYMENT OF ANTIACRAFT ARTILLERY IN THE COMBAT ZONE

Section I. AIR DEFENSE

96. General

Air defense includes all measures designed to nullify or reduce the effectiveness of the attack of hostile aircraft or guided missiles after they are airborne.

97. Means of Defense

a. The following means are available for air defense:

- (1) *Active*. Direct defensive action taken to destroy or reduce the effectiveness of an enemy air attack. Active air defense includes such measures as the use of fighter aircraft, antiaircraft artillery, electronic countermeasures, and ground (ship)-to-air guided missiles.
- (2) *Passive*. All measures, other than active defense, taken to minimize the effects of hostile air action. These include the use of cover, concealment, camouflage, and dispersion.

b. In order to reduce the commitment of military forces to air defense missions, maximum use of passive measures and nonmilitary personnel must be made. In protecting certain vulnerable areas there will be an allocation of interceptor aircraft for general air defense of the area and AAA will be provided for local air defenses. Because of its limited availability AAA will be assigned for protection of only the most vital vulnerable areas.

98. Factors Affecting Air Defense Mission

There are five major factors that affect the accomplishment of the air defense mission by AAA with the means allocated (par. 46). Detailed information concerning the design of AAA defenses is contained in FM 44-1.

a. *Enemy Tactics, Techniques, and Capabilities*. The tactics, techniques, and capabilities of the enemy will change from time to time and will differ depending upon the location of the vulnerable area with respect to the enemy air bases. The extent to which the enemy

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exercises any or all of these capabilities will be a determining factor in the siting of AAA.

b. Capabilities and Limitations of AAA Weapons. In planning AAA defense such limitations as range, dead areas, tracking rates, and the effectiveness of all fire units must be considered.

c. Vulnerable Area. The size, shape, and nature of the vulnerable area will affect the accomplishment of the mission.

d. Weather and Terrain. Terrain will influence both the type and direction of attack by the enemy and also dictate the location of fire unit position areas. Weather conditions such as extremely high or low temperatures, large amounts of rainfall, and prevailing winds may influence the siting of AAA.

e. Other Air Defense Means. The existence of other available air defense means such as, AAA in the area, large numbers of interceptor aircraft or passive air defense measures will influence both the amount and disposition of AAA.

99. Flexibility

AAA organizations possess an inherent flexibility which enables them to be organized in the pattern that will best fit the needs of any specific air defense.

100. Priorities

Air defense is provided for critical areas and installations according to the degree of their importance. This relative importance is set forth in the priority list established by the appropriate commander (par. 45). Starting with the number one priority, the AAA commander disposes his fire units to establish the *minimum effective defense* for each priority installation in order of priority. Any remaining fire units will be used to strengthen the high priority installations.

101. Antiaircraft Artillery in the Army Service Area

The army SOP normally will provide for centralized control. The senior AAA commander in the army exercises control of all AAA units assigned an air defense mission and deployed within the geographical limits of the army area in rear of the corps' rear boundary. In order to insure the most effective use of antiaircraft artillery deployed for air defense purposes in the army service area, the senior AAA commander in the army will coordinate the deployment of units to form effective area defenses, and assignment of primary sectors of fire. The senior AAA commander in the army will establish and operate an integrated AAAIS system for the army area in rear of the corps' rear boundary.

102. Antiaircraft Artillery in Corps Area

The corps commander determines the mission (air defense or surface) of the AAA that is assigned or attached to the corps. In addition, he will establish the priority for the air defense of the installations within the corps area. The corps artillery commander will allocate his AAA based upon these priorities. Regardless of the disposition of the AAA fire units with the corps, all AAA fires employed in air defense should be controlled by the senior or designated AAA commander through his AAOC. Present doctrine provides that the senior AAA commander will exercise control of AAA units engaged in air defense. He has no other authority over AAA units other than his own. Control must be exercised by the senior or designated AAA commander who becomes, in effect, a deputy to the corps artillery commander for control of AAA fire in air defense. All other command matters stem from corps artillery headquarters and follow normal command channels.

103. Antiaircraft Artillery in the Division Area

a. The division commander will determine the mission (air defense or surface) of the AAA that is assigned or attached to the division. In addition, he will establish the priority for the air defense of the installations within the division area. The division artillery commander will allocate his AAA based upon these priorities.

b. Effective air defense requires the highest degree of coordination and, whenever possible, centralized tactical fire control of all air defense elements deployed in the corps zone of action (including division areas). Through coordination, integration of defenses in division and corps areas can be obtained, resulting in a saving of materiel and providing a stronger overall AA defense.

Section II. SURFACE MISSION

104. General

In a surface mission antiaircraft artillery may be employed as follows:

- a. To engage surface targets (ground and waterborne).
- b. To provide fire support to other combat units.
- c. When AAA units are assigned a surface mission they should, monitor the operational control and intelligence nets of the nearest AAOC so that those units with available AAA fire control equipment can effectively engage hostile aerial targets when such action will not interfere with the assigned mission.

105. Capabilities and Limitations of AAA Weapons

a. General. To employ AAA effectively in a surface mission, a thorough understanding of the capabilities and limitations of AAA weapons is necessary. It must be borne in mind that these weapons are primarily designed to engage aircraft in an air defense mission rather than ground targets in a surface mission.

b. Medium AAA.

- (1) Antiaircraft artillery guns are characterized by their high rate of fire; unlimited traverse (the ability to traverse 360°, which makes them an excellent weapon to protect flanks of a sector); their relatively long range, comparable to heavy field artillery; and their high muzzle velocity and penetrating ability which is effective against fortification and armored vehicles.
- (2) Some of the important limitations are: The fixed propelling charge, that is the lack of multicharge characteristics such as that of field artillery; limited tactical mobility; small lethal area of projectile; flat trajectory, which is desirable for direct firing but a disadvantage for indirect fire; range dispersion; rapid tube erosion due to high muzzle velocity, which necessitates the availability of a supply of extra gun tubes for these weapons; and high silhouette which makes the guns difficult to revet and camouflage.

c. Light AAA.

- (1) Some of the desirable characteristics of light AAA are: Their high cyclic rate of fire; high muzzle velocity which enables them to fire on light emplacements with considerable penetrating power; accuracy which makes them valuable for firing direct fire at pinpoint targets; and their mobility.
- (2) Some of the important limitations of light AAA are: Flat trajectory fire which makes firing from defilade difficult; high silhouette making camouflage and revetment difficult; lack of protective armor; noise, particularly in self-propelled weapons when moving into position; ammunition characteristics; and large ammunition expenditures.

106. Field Artillery Mission

a. When acting as field artillery, medium and heavy AAA will assume the same status as the field artillery, that is, to support combat units on the field of battle. Antiaircraft artillery units in a field artillery mission will apply, as far as practicable and applicable, the principles, techniques, and tactics of field artillery.

b. In support of combat units, AAA will normally be assigned a reinforcing mission. However, they may be assigned any one of the field artillery tactical missions (par. 59).

c. In addition to the above field artillery tactical missions, AAA units sited for *air defense*, but within range of enemy surface targets, may be required to fire against such targets. The fires of a nearby field artillery battalion may be augmented by a medium or heavy AAA unit when such fires will not interfere with its air defense mission.

107. Augmenting the Fire of a Supported Unit

a. When AAA is used to augment the fire of a supported unit's weapons or to act as the supported unit's weapons, it will normally be attached to the supported unit. For details of employment see FM 44-2 and FM 44-4.

b. When light AAA is assigned a mission of close support of infantry or armor, part of the weapons may be given such missions as interdiction, harassing, and neutralization types of fire. The remainder of the weapons may augment the infantry or armor heavy weapons in furnishing close support by overhead fire and fire through gaps in the friendly lines. These close support weapons aid in limiting enemy penetration, fire within portions of the defended area that have been penetrated by the enemy, and support friendly counter-attacks.

108. Waterborne Targets

AAA may be employed against waterborne targets such as motor torpedo boats, landing craft, destroyers, transports, submarines and other types of naval craft. When AAA is employed in a surface mission against naval craft and located in or near a harbor defense, its employment should be coordinated by the harbor entrance control post (HECP) (FM 44-4).

CHAPTER 7

OFFENSIVE COMBAT

109. General

The purpose of offensive action is the destruction of the effectiveness of the enemy's armed forces and of his will to fight. The offensive is conducted as an attack in war of movement or as an attack of an organized position. Attack maneuvers are classified as envelopments and penetrations (FM 100-5). Tactical groupings provide for one or more main or decisive attacks in which the greatest possible offensive power is concentrated to bring about a decision, and one or more secondary attacks whose missions are to render maximum assistance to the main attack.

110. Artillery Employment

Artillery must be so disposed and organized that it can protect assembly and attack positions and the movement into them, execute the necessary fires prior to the attack, furnish continuous support throughout the action, and protect the attacking units during the periods of reorganization. The bulk of the field artillery supports the main attack. Priority for AAA defense is given those elements and installations whose security is most vital to the accomplishment of the mission. These priorities may include artillery position areas, critical points, reserves, assembly areas, supply installations, and concentrations of troops involved in the main effort.

111. Position Areas

Field artillery position areas in offensive combat are located so as to exploit the range of the weapons, facilitate communication and liaison, and support the attack as long as possible without displacement.

112. Control

In an advance guard action and in a meeting engagement, control of artillery is of necessity usually decentralized. During the progress of the development of a position, control is normally centralized as soon as circumstances permit. Prior to a preparation, control is centralized and remains so as long as possible during the attack. As the at-

tack develops or the pursuit begins, control may again become decentralized or partially decentralized.

113. Registration

a. Registration increases the accuracy of subsequent fires, permits placing unobserved fires close to friendly troops, and saves ammunition. Unrestricted registration discloses the artillery positions and thereby indicates the size and deployment of the force, indicates the commander's intentions, and invites neutralization. The disadvantages of registration can be minimized by using special registration positions, by keeping the number of registering batteries to the effective minimum, by registering as late as practicable before the attack, and by registering units simultaneously.

b. The force commander makes the decision as to whether registration will be restricted or prohibited. It is rarely necessary to prohibit registration completely. When conditions exist which indicate a requirement for restriction of registration, the force commander will coordinate registration.

114. Actions Prior to Attack

Actions of the artillery prior to the attack include—

- a. Preparation of fire plans including organization for combat (chs. 12 and 15).
- b. Reconnaissance, selection, and occupation of firing positions.
- c. Completion of the signal communication system.
- d. Common topographical control, established either by survey or by firing.
- e. Systematic organization and coordination of observation.
- f. Assembly of supplies and equipment in forward areas.
- g. Establishment of required liaison (par. 37 and fig. 6).
- h. Registration in accordance with the instructions or policy of the force commander.

115. Meeting Engagements

a. When the advance guard deploys, any artillery supporting it occupies position at once to cover the deployment. Usually artillery with the remainder of the column also immediately occupies position to furnish support. Units that have occupied positions during the advance guard action may have to displace early in order to be in forward positions to support an attack by the time it is launched. The artillery moving to positions should be given priority on roads.

b. The early employment of the observation battalion reconnaissance, radar, sound and flash, and survey elements is desirable. The

attachment of observation batteries to divisions initially will facilitate their early employment.

c. Prearranged artillery supporting fires are not limited to concentrations covering the initial advance from the line of departure but are limited only by the time available for planning and the extent and accuracy of target locations. Subsequent fires in support of the attack are called for by air and ground observers and liaison officers.

116. Pursuit and Encirclements

a. The artillery with a pursuit or encircling force is normally attached. Artillery attached to these forces should have great mobility and be capable of delivering fire quickly. For these reasons self-propelled artillery is desirable. Due to the difficulty of supplying ammunition and fuel to the artillery of the encircling force, it may be necessary to attach additional transportation.

b. Artillery with a direct pressure force is normally retained under the control of the force commander initially. As the action progresses artillery may be attached to units making the most progress. Long-range artillery usually remains under centralized control. Its fire missions include interdiction of enemy routes of withdrawal.

117. Field Artillery Support for Attack of an Organized Position

The bulk of the field artillery must be capable of supporting the main attack. If the main and secondary attacks are sufficiently close together, the artillery positions should permit the bulk of the field artillery to support the secondary attack also.

a. The attack of an organized position usually requires the delivery of a preparation. The situation encountered in each operation, however, will dictate whether a preparation is required.

b. Fires in support of the attack are prearranged as to location and, where justified by combat intelligence, as to time. Fires must be planned to protect the attacking unit during periods of reorganization.

118. Artillery Support of the Exploitation

a. Artillery with an exploiting force is normally attached. Since armored and motorized units are especially suitable for the mission of exploitation, the attached artillery must be highly mobile and capable of delivering fire quickly. Self-propelled artillery is desirable.

b. Long range artillery fire missions include interdiction of enemy routes of reinforcement or withdrawal.

CHAPTER 8

DEFENSIVE COMBAT AND RETROGRADE MOVEMENTS

Section I. DEFENSIVE COMBAT

119. General

a. *Objectives of Defensive Combat* (FM 100-5). The general objective of defensive combat is to gain time pending the development of more favorable conditions for undertaking the offensive, or to economize forces on one front for the purpose of concentrating superior forces for a decisive action elsewhere.

- (1) Under the first of these objectives, a commander may assume the defensive pending the arrival of reinforcements, or he may be thrown on the defensive by inferiority in numbers, disposition, or training. He may take up a defensive position and invite attack as part of a deliberate plan to win the battle by a counteroffensive.
- (2) Under the second objective, the defensive usually is expressed in the mission received from higher authority. This mission may be to hold a vital area pending completion of the maneuver of other forces, to protect a flank, or to contain an enemy force while an offensive is being conducted on another part of the front or in another theater. Defensive measures always will be taken, in the absence of specific instructions, when an attack has reached its objective or is unable to continue the advance.

b. *Defensive Doctrine*.

- (1) *Position defense*. When conditions favor or permit the organization of the battle position into a system of defensive sectors that afford strong mutual support to one another, the defending forces are disposed in a relatively compact form to insure maximum strength of the defense. This form of defense may be called the position defense. The position defense is a compact defense in which effective mutual fire support by infantry weapons exists between adjacent defense areas organized in depth. Strong reserves are held out to deepen the defense and to counterattack enemy penetrations so that the position may be restored. The battle position is

carefully selected, organized, and is to be held at all costs or until defending units are ordered to withdraw by higher headquarters. The concept of the position defense envisions the decisive battle being fought on the battle position. This compact defensive form is the strongest defense that can be employed to hold a position beyond which the enemy must not be permitted to pass. Forward of the battle position maximum use is made of security forces to prevent surprise, to delay, to disorganize the advance of the enemy, and to deceive him as to the true location of the battle position.

(2) *Variations.* Many situations are encountered in which conditions do not permit or do not favor the adoption of the position defense. Some situations may preclude the organization of any defense and force the adoption of a delaying action. However, it is frequently possible for the defender to organize a determined defense even though the position defense cannot be adopted. Under these circumstances, the commander must vary the form of his defense to insure maximum employment of available forces and terrain. These variations or expedients are most frequently employed in the defense on a wide front or on frontages wider than those considered normal or desirable. Conditions may also dictate the employment of an elastic or mobile defense. The form of the defense adopted is the product of the application of the fundamentals of defense to the situation at hand. While the variants of the position defense are not considered as strong as the position defense itself, they do represent the best defense the defender can organize under the conditions that exist.

c. *Artillery Employment.* Artillery must be prepared to support all phases of defensive action. It must be capable of being employed in mass on critical localities and on ground that is weakly held, or that is defiladed from, or beyond the range of the fires of other supporting weapons. Properly employed artillery fire power may be the deciding factor in the conduct of a successful defense of a position.

120. Security Forces

Security forces have the mission of providing early warning of the approach of hostile forces, gaining time for the main forces to prepare for combat, forcing early deployment of the enemy, deceiving him as to the exact location of the battle position, and of observing the enemy's advance. Friendly aviation, covering forces, the general outpost, the combat outpost, and local security measures of forward

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elements of the battle position comprise the usual security echelons to the front. Artillery is employed in support of ground security forces.

a. *Covering Forces.* For a discussion of covering forces, see chapter 5.

b. *General Outpost.* The general outpost is garrisoned by divisions or comparable units assigned sectors on the main battle position. Artillery with the general outpost is made up of all calibers which are found in support of the battle position in order to deceive the enemy as to the location of the battle position. Artillery supporting the general outpost should be attached if the distance from the battle position is too great for centralized control. When supported by artillery from within the battle position, the general outpost receives artillery support from temporary positions to maintain the secrecy of the battle position. Upon withdrawal of the general outpost, attached artillery is released from attachment and occupies previously selected positions in support of the main force.

c. *Combat Outpost.* Suitable terrain forward of the battle position is occupied by combat outposts which are usually furnished by units lower than division holding a sector of the main line of resistance. The combat outpost is normally supported by the field artillery supporting the battle position. Artillery observers accompany the combat outpost.

121. Artillery Support of the Battle Position

a. *General.* Since the rapid concentration of artillery fire is essential to a successful defense, centralized control of artillery is required. Every effort is made to meet the main attack with a mass of artillery fire. Deceptive measures are employed to mislead the enemy as to the amount and location of artillery. Position areas are selected to provide continuous and effective artillery fire support throughout the action. Organization of positions, observation, communication, and fire planning are as complete as the time and situation permit.

b. Position Areas.

(1) *Location.* For a discussion of artillery position area requirements common to all types of operations, see chapter 5. The following are additional considerations in the location of artillery in defensive operations—

- (a) Artillery is echeloned in depth in order that continuous supporting fire may be provided in the event that an enemy penetration neutralizes the position areas of the forward artillery units.
- (b) In order to provide continuous defensive and counter-attack fires in the event of an enemy penetration, the bulk

of the light artillery should be able to fire throughout the depth of the battle position.

- (c) All of the light and the medium division artillery must be able to fire immediately in front of the main line of resistance.
- (d) Some artillery units are placed in forward positions to accomplish counterbattery and long-range harassing and interdiction missions.
- (e) In selecting positions advantage is taken of natural defensive features of the terrain and of incidental protection afforded by reserve units. Access to routes of withdrawal is considered.
- (f) Dispersion of artillery positions consistent with the attainment of effective fire support is sought as a means of limiting the neutralization of friendly artillery by hostile counterbattery, particularly when the enemy has the capability of employing atomic weapons.

(2) *Occupation of position.* Every effort is made to maintain secrecy in the occupation of position. Position areas are organized as completely as circumstances will permit. All units prepare their positions for defense against enemy ground attack with particular attention to antitank defense. Units must be prepared to counter airborne attack, guerrilla action, and infiltration (FM 100-5).

c. *Antiaircraft Artillery.* The strong possibility that the enemy will have local air superiority makes the period of organizing and occupying defensive positions a critical one. Light antiaircraft artillery is disposed initially to protect the organization of the main battle position from hostile air observation and air attack. After the position is organized, other elements of the defense take priority for air defense. Those high priority elements include troops defending the most vital areas of the battle position, the artillery, and the reserves in a counterattack. If sufficient antiaircraft artillery is available, some of the light AAA units will be given the defense of important supply installation and critical defiles along the routes to the defensive position. The AAAIS gives prompt warning of the approach of hostile aircraft to all units concerned. In planning a defense, emphasis must be placed on passive measures. The defense must be coordinated with adjacent units and tied into the AAAIS.

d. *Alternate and Rear Positions.*

- (1) In order to maintain itself in action in the face of hostile superiority, the artillery must employ deceptive measures and

must fully exploit its mobility. If artillery units receive severe counterbattery fire or their positions become otherwise untenable, artillery commanders displace their units to alternate positions. It is the responsibility of artillery battalion commanders that alternate positions are selected which permit the continuity of fire support. If the missions assigned in support of planned counterattacks cannot be carried out from primary positions, other positions must be selected from which such missions can be accomplished.

(2) The selection of a rear defensive position is essential to the conduct of a flexible defense. It should be located at such distance from the main position that it can be organized without enemy interference and that it forces the enemy to reorganize prior to continuing the attack. Artillery positions are selected from which fire can be delivered in support of the rear position. Displacement to rear positions when authorized is made on order of the artillery commander concerned. Alternate and rear positions are as completely prepared as time permits.

e. *Observation.* Field artillery observation should cover the entire sector of the defensive position and should extend as far forward of the main line of resistance as possible. All artillery echelons coordinate their ground observation to insure effective coverage. Maximum use is made of organic air observation and the facilities of the observation battalion.

f. *Communication.* The efficient operation of the artillery communications net is of special importance in order that the flexibility of artillery fire may be exploited to the maximum. Wire lines are installed as completely as time permits. Lateral lines are laid to provide alternate means of wire communication and principal circuits are buried or installed overhead when practicable.

g. *Fire Planning.* Detailed fire planning is essential for effective artillery support of defensive operations (ch. 12). In general, the artillery fire plan is based upon fires that—

- (1) Delay and disorganize the enemy in his approach to the position by long-range harassing and interdiction fire.
- (2) Disrupt the enemy's preparation for attack by counterpreparation fire (par 217).
- (3) Impede his attack with fire in width and depth throughout the defensive sector by close defensive fires.
- (4) Break up the assault on the battle position by final protective fires.

- (5) Limit penetration of the battle position by fire within friendly lines delivered on call.
- (6) Support the counterattack.

Section II. RETROGRADE MOVEMENTS

122. General

A retrograde movement is any movement of a command away from the enemy. It may be forced by the enemy or may be made voluntarily. It may be classified as a withdrawal from action, a retirement, or a delaying action. Retrograde movements are usually covered by a mobile security force which devotes particular attention to flank security to avoid envelopment of the main forces (FM 100-5).

123. Artillery Employment

In retrograde movements the mission of the artillery is to neutralize the enemy artillery, to delay the enemy advance, and to assist the infantry or armor in disengaging from action. It must be prepared to give continuous support during all types of retrograde action. A primary consideration is the air defense of elements moving to the rear and critical points along the route since it is essential that the leading elements not be stopped and the withdrawal route blocked. Another important consideration is the rear guard and artillery remaining in position to cover the withdrawal. The commander concerned will establish the necessary priorities for the employment of his AAA.

124. Withdrawal From Action

a. A withdrawal from action is the operation by which a force disengages from the enemy. The general purpose of the withdrawal from action is to regain or preserve freedom of action. It may be followed by a retirement, delaying action, or a defense on another position. Contact with the enemy is maintained by reconnaissance or security forces. To avoid enemy detection, withdrawals from action are normally accomplished at night.

b. For the employment of artillery with the security forces covering the withdrawal, see paragraph 73. The bulk of the artillery is withdrawn with the supported units. Heavy artillery is moved to the rear early. *The appearance of normal artillery fire is kept up by artillery with the security force and by retaining units or portions of units of different calibers in position to be withdrawn with the last elements.* These units are well stocked with ammunition. Deceptive measures are employed during the withdrawal.

125. Delaying Action

The employment of artillery in a delaying action is similar to that with a rear guard (par. 73).

126. Retirement

a. A retirement is the retrograde movement by which a force seeks to refuse decisive combat under the existing situation by marching away from the enemy. A retirement may be made following a withdrawal from action or when no actual contact with the enemy has been made. When a withdrawal from action precedes the retirement, the actual retirement begins after the main forces have broken contact with the enemy and when march columns have been formed. A retirement is screened by appropriate security forces (FM 100-5).

b. Strong artillery support is provided the security forces. The remainder of the artillery is so disposed in the column or columns as to support the main body or to furnish additional support for the security forces.

CHAPTER 9

ARTILLERY IN SPECIAL OPERATIONS

Section I. GENERAL

127. Introduction

Special operations are those in which the terrain, weather, nature of the operation, or a combination of these create the need for special techniques, tactics, training, or equipment. Although treated as special operations in this manual, *such operations are considered normal by troops operating in situations where the above conditions prevail.* In special operations the basic missions of artillery remains unchanged, but the basic tactics and techniques may be modified.

128. Plans and Estimates

The artillery commander at each echelon of command is responsible that a continuous estimate of the situation is made and that plans are prepared to provide adequate fire support and air defense for the maneuvering forces. Artillery commanders should seek to insure that personnel on their own staffs are trained in the detailed planning of logistical support for special operations when such operations are contemplated.

a. Information and intelligence upon which to base estimates will often be acquired from agencies outside the control of the artillery. In certain special operations it will be impossible to verify much of the information received because of remoteness or inaccessibility of the area in which the operation is to be conducted. Plans developed from estimates that are based on this type information must be extremely flexible so as to be applicable to unforeseeable situations in the combat area.

b. Artillery plans for special operations will include such considerations as—

- (1) Liaison and coordination with appropriate arms and services of all forces concerned. Close liaison and coordination must be maintained continuously throughout the planning of, preparation for, and execution of the operation.
- (2) Acquisition, evaluation, and analysis of targets.
- (3) Coordination of fire support for the attack of targets by Army, Navy, and Air Force.

- (4) Amount and types of artillery and ammunition required during various stages of the operation.
- (5) Initial organization for combat and anticipated changes during the course of the operation.
- (6) Special equipment, clothing, and training required for units engaging in the operation.
- (7) Details of employment of artillery units, to include movement into selected position areas, registration and fire plans, and survey requirements.

129. Training

a. Suitable training areas are provided for developing individual techniques required in special operations. The training time necessary to attain adequate proficiency will vary from a few days to several months, depending upon the initial state of training of the troops and the type of operation being planned.

b. Artillery training for special operations includes—

- (1) The use of appropriate special equipment.
- (2) Operation, care, and maintenance of equipment under conditions of terrain and weather to be encountered.
- (3) Special techniques required in applying the basic artillery combat principles.

130. Liaison

a. Liaison assumes major importance in special operations. While normal command liaison channels are maintained, special and staff liaison must be established between all major elements involved in the operation, as well as expansion of liaison between echelons within each element. To be effective, liaison must be established early and maintained continuously in order to insure smooth and efficient progress from one phase of planning and preparation to the next. Exchange of information and coordination of plans are necessary to assure the commander that artillery is used to the maximum advantage and that, in the case of combined operations, provision is made for smooth transition of responsibility for fire support coordination from one force to another.

b. Added liaison requirements during preparation for, and conduct of, a special operation will necessitate assigning this function as an additional duty to staff members and lower commanders. This procedure, although placing a greater burden on designated staff members and commanders, is desirable because those involved in liaison and coordination are also directly involved in planning for their respective units.

131. Control

The type of operation and plan of maneuver will determine whether control is centralized or decentralized initially. When communication exists through which the division, corps, or force commander can quickly control and mass the fire of the bulk of the artillery, control is centralized. When such communication does not exist, control is decentralized. The mere fact that distances between units permit communication does not dictate centralized control. If decentralized initially, control of artillery should be centralized as quickly as practical in order that the force commander may have available a mass of fire to be employed as the situation dictates.

132. Meteorological Conditions

Extremes in weather will result in large corrections to the normal trajectory. Rapid changes in weather conditions will make meteorological (metro) data valid for only short periods of time. Under such conditions there is a need for more frequent registrations as well as for more frequent determination of meteorological data.

Section II. AMPHIBIOUS OPERATIONS

133. General

a. The complex nature of amphibious operations makes detailed planning of paramount importance. An outstanding difference between amphibious operations and other operations is the ship-to-shore movement. Centralized control is lost after embarkation aboard ship until reorganization ashore. During this interval, which may extend for several weeks, the actions of artillery units embarked separately must often be governed exclusively by written orders.

b. Because shipping requirements frequently disrupt the unity of artillery organizations, it is necessary that combat orders be written in much more detail than orders for other types of operations. Considerations for planning that are unique in amphibious operations are discussed in the following paragraphs. For further details on amphibious operations see FM 6-101, FM 60-5, FM 60-30, and FM 100-5.

134. Initiation of Planning

a. The landing force commander begins planning upon receipt of the initial directive for the operation. The artillery commander with the landing force insures that liaison is established immediately between all artillery echelons. As the broad plans for the operation are formulated, the artillery commander of the landing force issues training directives to lower echelons, readying them for combat along the

lines of the proposed plan. Upon approval of the fire support plan by the landing force commander, the necessary instructions are prepared to put the plan into effect. The fire support plan furnishes complete tactical and technical instructions to the fire support means with the force.

b. In a corps operation, each division artillery commander and his staff initiate planning upon receipt of the corps warning order. The details of the division artillery operation plan are completed as soon as possible after the corps fire support plan is received.

c. The division artillery operation order will be sufficiently detailed that issuance of comprehensive orders by subordinate headquarters is unnecessary. The battalion operation plan will be brief. It will contain pertinent extracts and references to the division artillery plan and the battalion standing operating procedure. Embarkation and debarkation schedules and boat assignment tables will be included in the battalion operation plan.

135. Estimates

a. The landing force commander in preparing his estimate of the situation requires his artillery commander to make an estimate of the situation, from which are developed the artillery requirements. The artillery commander's estimate of requirements must be a continuous process in order that recommendations and plans be kept abreast of the situation.

b. Normally, the initial operational directive indicates the means to be placed at the disposal of the landing force commander to accomplish the assigned mission. However, since the successful accomplishment of that mission is the commander's responsibility, it is essential that an estimate of the artillery requirements be made in order to insure the adequacy of the artillery provided. This estimate is made initially to determine the amount and type of—

- (1) Artillery required by caliber.
- (2) Ammunition required.
- (3) Special equipment needed.
- (4) Shipping, landing craft, and landing vehicles required.

c. In arriving at the estimate of artillery requirements, the factors listed below must be given special emphasis.

- (1) *Mission of the landing force.* In this type operation the mission directly affects the shipping and resupply problem. If the landing is to be followed by sustained land operations beyond the beachhead, shipping allocations must be adequate to support the artillery ammunition resupply and replacement requirements. The estimated duration of the opera-

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tion will have its greatest effect on the amount of ammunition embarked. For a short operation, emphasis may be placed on initial embarkation of ammunition, whereas a long campaign will necessitate provision for resupply of virtually all equipment in addition to ammunition.

(2) *Landing force plan of maneuver.* Artillery requirements will vary with the landing force plan of maneuver as well as with the relative location of landing beaches. If the force lands on adjacent beaches in a single sector the artillery support problem is much simpler than if the assault consists of main and diversionary landings made at widely separated beaches. The plan of maneuver after breaking out of the beachhead strongly influences the amount of artillery required.

(3) *Terrain, weather, and hydrographic characteristics.* In addition to the information normally required concerning weather and terrain in the objective area, special information is needed pertaining to the beach areas. Gradients and widths of beaches, prevailing surf conditions, presence of submerged barriers, texture of sand, and existence of obstacles inland from the beach will affect the types and amounts of ships, landing craft, amphibious vehicles, and special equipment required by the artillery in getting on and across the beaches.

(4) *Enemy capabilities.* The enemy capabilities, based on estimated strength, composition, disposition, status of supply, reinforcements, morale, and training, must be considered and evaluated in order to determine artillery requirements.

(5) *Employment of other fire support means.*

(a) Estimates of artillery requirements should include consideration of landing force weapons capable of augmenting or replacing artillery. These include tanks, antiaircraft artillery, and the landing vehicle, tracked (armored), (LVT(A)). Only those that can actually replace field artillery should be allowed to influence that estimate. If none of the artillery-type weapons are to be continuously available, the estimate of the amount of artillery required will not be affected. If these weapons will be available during specified periods of the operation, the amount of field artillery ammunition required may be affected by their assumption of certain field artillery missions. The artillery commander must coordinate the ammunition allocation.

tions that must be increased for other weapons in order to permit them to assume a field artillery role.

(b) Naval gunfire is especially suited to assume some of corps artillery's missions of reinforcing the fires of division artillery and execution of long-range, heavy caliber, general support missions. When planning its employment, its shortcomings must be kept in mind. It cannot be readily massed and its ability to deliver precision or close supporting fires may be seriously handicapped during periods of reduced visibility. If the operation progresses inland beyond the range of naval guns, the estimate must provide for the landing of field artillery of the proper type and caliber to replace their fires.

d. The estimate of artillery requirements should be written, because of its operational importance and the desirability of keeping a permanent record of the estimate for assistance in future planning. In determining the artillery requirements, the factors discussed above are considered in turn.

136. The Artillery Plan

a. *Organization for Combat.* The principles of organization for combat that apply to normal land operations are applicable in amphibious operations. Division artillery units supporting assault regiments are given direct support missions. Other divisional artillery units should be given a mission of general support, or reinforcing, or formed into battalion-groups with direct support battalions. Corps artillery battalions should be attached to divisions initially or assigned the mission of reinforcing a division artillery. Amphibious vehicles to be used by the artillery for the ship-to-shore movement should be attached to the artillery for embarkation and the period necessary to land the artillery and its ammunition.

b. *Organization for Embarkation.*

(1) Division artillery should normally be organized for embarkation as a separate embarkation group. However, the following personnel are usually embarked with other elements of the landing force:

- (a) Corps artillery and division artillery commanders with their fire support coordination center personnel are embarked with their respective commanding generals.
- (b) Artillery air observers and pilots are normally embarked in the shipping transporting the liaison aircraft.
- (c) Forward observer and liaison parties are embarked with their appropriate supported units. Data in each of the

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above cases, as to personnel and space requirements, must be furnished to the commanding officer of troops on the ship or ships in which embarked. The remainder of the artillery should be embarked in such a manner as to maintain the tactical unity of the organizations.

(2) It has been found that the landing ship, tank, (LST), is, in most instances, the best ship for transporting artillery. Medium and heavier artillery should be loaded on attack transports (APA) or attack cargo ships (AKA) if it is impractical to beach LST's at the target area.

c. *Zones of Fire.* Principles for establishing zones of fire in normal land operations are applicable to amphibious operations. However, a beachhead operation may be likened to a salient, in that the artillery may have a field of fire as great as 3,200 mils. It is very difficult in such a situation, to mass the bulk of the fires of the division artillery and it may be several days before all artillery units participating in a landing can dig-in the necessary positions and clear the fields of fire to cover other than their normal zones of fire. With proper planning it will usually be possible, by assignment of contingent zones of fire, to provide for reasonable massing of artillery fires. Assignment of normal and contingent zones of fires should provide for massed fires on suspected areas of enemy concentration. Zones are normally assigned laterally; however, zones in depth may be assigned. In determining the zones of fire the artillery commander must consider the necessity of covering dead spaces in the zones of action of assault units. Units to the flank may be able to provide fire into spaces defiled from other units. In such cases crossfire must be employed for maximum fire support. Minimum range considerations may also dictate the use of crossfire in order to provide fire support early in the operation, while the assault units are expanding the beachhead. If crossfire is impractical, contingent zones of fire may be assigned to assure coverage of defiled areas.

d. *Position Areas.* The landing force artillery commander must coordinate the assignment of position areas for the artillery units of the force. Each lower echelon must further subdivide its assigned area for the units of its command. A map and photo reconnaissance will be made, keeping in mind the following factors that will affect the selection of the position areas:

- (1) The primary consideration is the ability of artillery to cover the designated zones of fire.
- (2) Because of the congestion in the beachhead area, it is essential that close liaison be maintained during the planning phase between the artillery and other elements that will also

occupy the beachhead during the early stages of the landing. Particular attention must be given to the coordination of position areas with the location of supply dumps, engineer construction, and routes of communication.

- (3) In the limited space of the beachhead, few good position areas will be available and many desirable features such as defilade, concealment, dispersion, and good supply roads must be partially or completely sacrificed. Areas should be selected to provide the maximum possible security for the comparatively immobile artillery. Medium and heavy artillery must be located so that a temporary change in lines will not expose them to enemy small arms fire.
- (4) Positions should be chosen so as to be accessible from the proposed landing points.

e. Target Information. Artillery intelligence exploits every available source and agency to locate targets during the planning phase. Requests for photos, taken at frequent intervals, must be made and the photos furnished to all echelons for study. Schedules of type targets and priority for attack are made by the fire support coordination center and furnished to the appropriate artillery headquarters. The fire support coordination center keeps these schedules current by study of the latest aerial photographs and post attack analysis reports of air strikes and preliminary bombardment by the advance force. At every opportunity corrections are furnished to those headquarters previously issued the schedules of targets. This process is continuous, not only during the planning phase, but throughout the operation.

f. Communication.

- (1) *Radio.* The control and coordination of artillery units of the landing force during the ship-to-shore movement makes it imperative that a communication plan meeting the requirements of simplicity, reliability, and flexibility be placed in effect. The artillery communication plan must provide for communication between the division artillery commander, all subordinate elements, and the division control officer, whether they are afloat or ashore. It must provide communication between the battalion commander and subordinate elements including forward observers and liaison officers with the infantry, whether afloat or ashore. Radio channels assigned must be utilized to establish communication on the simplest and most flexible net possible. Because of frequent reassignment of artillery units in supporting and reinforcing missions, a detailed radio plan to include all frequencies of artillery units is usually included as a tab to the artillery

appendix to the fire support plan annex. During the planning phase, communication equipment that will be needed by other supporting weapons to communicate with the artillery, if assigned an artillery mission, must be determined and requested from the proper supply source and these units must be included in the artillery communication plan.

(2) *Wire.* Wire communication plans must be detailed and include the proposed line route maps of all lower echelons. Wire teams should be briefed with maps and aerial photos as to the routes to be followed in the laying of wire nets. Decentralization of wire laying should be planned. The urgency of attaining complete wire communication at the earliest practicable moment requires detailed prior planning.

g. Ammunition Supply. The artillery commander of each echelon must have a detailed ammunition plan. These plans should provide for the rapid unloading of ammunition and its delivery to units in firing positions ashore without confusion as to caliber, type, and weight of shell, type of fuzes, or powder lot number. In addition, plans should provide for delivery of ammunition to firing units or dumps ashore with the minimum of rehandling en route. It must be determined whether palletizing all or any portion of the artillery ammunition will accelerate or delay its unloading. Consideration should be given to the amount of organic transportation that will be landed and its availability for handling ammunition ashore. Coordination of ammunition unloading with shore party and control groups personnel is necessary to insure that ammunition-carrying amphibious vehicles are not detained or diverted to other use during the unloading phase.

h. Time of landing. It is impracticable to plan a definite time for landing of the artillery since that time will depend on such variables as availability of position areas, need for artillery ashore, conditions of beach entrances and exits, and the ability of the shore party to effect the landing. Artillery plans will usually state that division and corps artillery battalions will land on order of the division and corps commanders respectively. This requires the corps and division artillery commanders to make a continuous study of the situation ashore and recommend the landing of elements of their respective commands at the most propitious time. This study will be based on all available information that is received on the command ships, and particularly the reports from the forward observers and liaison officers ashore. The reconnaissance parties will recommend to the division or corps artillery commander the proper times for debarkation and landing of the various remaining elements of the artillery afloat.

i. Reconnaissance. During planning, a continuous reconnaissance is made utilizing all available maps and photos of the objective. If practicable, an air or seaborne reconnaissance by artillery officers should be made to assist in selection of the best landing beaches, position areas, routes from the beaches to the position areas, observation facilities within the beach area and immediate terrain inland. The plan for the ground reconnaissance should include the size of the party and its composition. Appreciably larger parties than are used in normal land warfare must be employed to facilitate the selection and preparation of position areas for the immediate entry into action of the units upon landing. Sufficient guides, communication, survey, fire direction, local security, and pioneer personnel must be included to insure thorough reconnaissance and rapid preparation and occupation of positions. During planning, arrangements should be made with the shore party for that unit to reconnoiter for artillery landing points and artillery LST beaching areas.

j. Ship-to-Shore Movement. Planning the ship-to-shore movement resolves itself into determining the best procedure for landing the artillery elements. The best procedure will be determined after consideration of the factors listed above. This will mean provision of boats or amphibious vehicles, depending on hydrographic conditions, in sufficient quantity at the proper place and time. The debarkation schedule and the boat assignment tables will set forth this plan.

k. Artillery Support of the Beach Assault. Artillery support of the beach assault should be employed whenever possible. As artillery can bring barrages and concentrations in close to the infantry, can place accurate destruction fire on targets susceptible to destruction by small calibers, and can fire with accuracy at night and during periods of low visibility, considerable advantage accrues to the infantry when the artillery is set up to give normal and continuous fire support throughout the beach assault. Such support is possible in atoll warfare, water-borne envelopments, and where the geographical and tactical situation is favorable on large islands or land masses. To support the beach assault the artillery battalions may be emplaced on islands adjacent to the assault beaches, or on a peninsula or promontory from which fire can be placed on the proposed landing beaches. The plan must provide detailed plans for supporting fires. The primary concern is that the main landing area be within effective range so that the artillery can support not only the landing but also the continuation of the attack ashore.

137. Rehearsal

Because of the many details involved, it is essential that the plans for an amphibious operation be tested by rehearsal in order to insure

that all units are familiar with the embarkation and debarkation procedures and techniques. The rehearsal should simulate, as closely as possible, conditions to be expected at the target, to include firing of live ammunition by the units participating.

138. Movement to the Beach

In an amphibious operation, certain elements of a field artillery organization must land prior to the landing of the guns. These elements include forward observers, liaison personnel, and reconnaissance parties. This procedure is followed so that observers will be in position, liaison will be functioning, and the necessary reconnaissance of the position area completed prior to the time the firing batteries arrive on the beach. This procedure is essential to an orderly and well controlled landing.

a. The sequence of landing when a complete ship-to-shore movement for all elements is required is given below:

- (1) Forward observer parties are embarked and landed with each infantry rifle company.
- (2) An artillery liaison party lands with each infantry battalion and regimental command post. Forward observers and liaison officers keep their artillery headquarters informed as to likely landing beaches, exits from the beach, the condition of position areas, and the progress of elements ashore.
- (3) Antiaircraft artillery should be landed in the early assault phases in order to provide air defense of the beachhead.
- (4) The artillery reconnaissance parties are landed as early as the situation permits, to reconnoiter the tentative position areas and select final positions for the necessary installations. Being mindful of the time and space factors involved and the situation ashore, the reconnaissance party commander will recommend to the proper headquarters the time to debark the remainder of the unit.
- (5) After the reconnaissance has been completed and when the beach areas are reasonably free from enemy fire, the artillery unit will be landed on request of the reconnaissance commander. Upon debarkation, the unit assembles in a rendezvous area afloat and then proceeds to its position area. The remainder of the unloading activities are a ferrying operation of ammunition, other supplies, and remaining personnel and equipment from the ships to the artillery position areas.
- (6) Reconnaissance parties of division and corps artillery headquarters batteries should be landed at about the same time as those of their subordinate battalions. The remainder of these

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batteries are landed on the request of the reconnaissance party commander. The division artillery executive officer is normally placed in charge of division artillery operations ashore until the division artillery commander lands. The assistant corps artillery officer or corps artillery executive officer is normally placed in charge of corps artillery operations ashore until the corps artillery commander lands.

(7) The corps and division artillery commanders and fire support coordination centers will be embarked with the corps and division commanders and will move ashore when the command post of the echelon is landed. Corps and division FSCC's usually displace ashore in two echelons, the second to be displaced after the first is in operation ashore. Responsibility for coordination of fire support passes from the naval attack force to the landing force when the landing force commander opens his CP ashore.

b. When the artillery is to be landed from beached LST's the number of elements required to execute the ship-to-shore movement will be reduced. LST's are moved to the inner LST area to launch the reconnaissance parties. Upon request of the reconnaissance party commander that the remainder of the unit be ordered ashore, if the tactical situation on the beach permits, the beach is sufficiently clear of enemy fire, and hydrographic conditions permit, the LST's will be beached. LST's carrying medium and heavy artillery must be beached for the debarkation of those units. Those LST's carrying ammunition will also be beached to facilitate unloading.

Section III. AIRBORNE OPERATIONS

139. General

a. An airborne operation is an operation involving the movement of armed forces by air into an objective area for ground combat. Supplies and reinforcements may be transported by aircraft, truck, or ship, depending upon the geographical location of the objective area and the means available (FM 57-30). Once an airborne force has landed and reorganized, it accomplishes its ground mission utilizing the same tactics and techniques used in normal ground combat. The mission, then, of artillery in the airhead is the same as for artillery in any other type operation (FM 57-20).

b. Artillery participating in airborne operations may be of the airborne type or the air transported type. *Airborne artillery* units are organized, equipped, and trained primarily for making assault landings from the air. *Air transported artillery* units are artillery units,

other than airborne artillery, which are trained and equipped for movement and delivery into an objective area by transport aircraft.

c. Factors requiring special consideration in an airborne operation are preassault planning, refresher training in air transportation techniques, application of rigid security and almost complete dependence on outside agencies for information concerning the objective area with particular reference to position areas and target intelligence (FM 57-20, FM 57-30, and TM 57-210).

140. Plans and Estimates

Preliminary plans and estimates for airborne operations originate at theater level (FM 57-30) with the tentative selection of missions for the airborne units. Joint airborne force develops, or assigns to subordinate airborne task forces for development, detailed operational plans for specific units. With announcement of the complete planning directive, concurrent and continued planning is undertaken at all echelons of the affected units. Techniques and procedures for airborne planning are contained in FM 57-20 and FM-30. It should be emphasized that commanders and staffs at each level of command are included in the planning sessions of the next higher headquarters. Similarly, it is desirable that artillery representatives be included as members of the supported unit's planning groups. This practice expedites concurrent planning at all echelons through personal co-ordination between successive headquarters. During the early phases, plans must be developed from estimates that may be based on fragmentary information. All such plans, however, are subject to change as more complete and reliable information becomes available to the subordinate units.

141. Training

a. An analysis of the airborne force mission and the elements of intelligence concerning the drop area and objective will indicate the type of training that must be stressed or for which refresher courses must be conducted. Special attention will be devoted to training in loading (TM 57-210). The types of aircraft that are to be allocated to each unit should be determined as early as possible. In case types of aircraft with which the units are unfamiliar are included in the allocation, additional training in loading will be necessary to insure efficient operation. Training will include complete rehearsals and practice landing areas should be selected which resemble the terrain of the actual landing area as closely as possible.

b. Although it is desirable to drop or air land the artillery on landing areas already secured by the infantry, changing situations may

force artillery units to defend themselves in the drop or landing zone or to fight their way to designated assembly or position areas. These probabilities require that artillery units be trained in infantry tactics, to include fire and maneuver and use of individual weapons, and delivery of direct fire by single howitzers. In addition, the artillery must be trained for the following eventualities:

- (1) Decentralized control.
- (2) Movement of pieces by hand.
- (3) Communication by radio only.
- (4) Defense of own position.
- (5) Abnormally large sectors of fire.

142. Intelligence

Information and intelligence concerning the landing area and objective will be obtained from higher headquarters and from agencies not under the control of the artillery (FM 57-30). The artillery's principal means of supplementing target information is through interpretation of aerial photographs. Therefore, it is mandatory that complete aerial photographic coverage of the area of operations be available to the artillery commander. Photographic interpretation will constitute, in most cases, the only means of reconnaissance, selection of positions and routes to assembly areas, and identification and evaluation of targets.

143. Communication

Radio will be the principal means of ground and air-ground communication (FM 57-30). Visual signals and prearranged codes can supplement radio and will furnish quick and reliable communication, particularly between air and ground elements. Short wire lines, laid quickly by hand with light wire, will facilitate fire direction. The communication plan must provide for expansion from decentralized to centralized control and for communication with other supporting arms and services. The correct use of appropriate signal operations instructions (SOI) will reduce or eliminate much of the communication difficulties and confusion characteristic of early action in the area of operations.

144. Security

Surprise is a requisite for successful airborne operations. The amount of information that can be divulged to the troops and when it can be released is regulated at all echelons of command (FM 57-30). Usually, only a few key personnel are briefed prior to being sealed in the marshalling areas. However, every man is briefed concerning his role in the operation as soon as security permits.

~~SECRET~~ - ~~Classification~~

Section IV. ARCTIC OPERATIONS

145. General

Artillery units operating under arctic conditions are faced with two main problems: mobility and survival. The season of the year, equipment, and proper training affect the survival problem. Mobility is a greater problem during the warmer months than during the colder months. For additional information on arctic operations see FM 31-70, FM 31-71, FM 31-72, and FM 100-5.

146. Plans and Preparation

The types of artillery employed in arctic operations are dictated by the terrain and by the transportation available. T/O & E's often must be augmented to accomplish the assigned mission. Personnel and equipment must be made available well in advance of the operation so that training can be conducted under conditions similar to those anticipated in the operation. Troops must be trained in their primary duty prior to entrance into the arctic. Winterization of all items of equipment and installation of modification kits must be performed prior to entrance into arctic areas.

147. Survey

Survey in snow and extreme cold is slow and tedious. Instruments fog-up and recording and computation of data must be done in heated shelter. Control points are difficult to locate and will normally be found only along well established roads and railroads. Due to deep snow, crevices, and other obstacles natural to arctic terrain, it will often be simpler and faster to run a survey by following existing roads and trails even though the cross-country distance is considerably shorter.

148. Movement

The best time of the year for movement of heavy vehicles cross-country is during the latter part of the freeze-up period and the first part of the winter period prior to the arrival of heavy snows. The use of over-snow vehicles increases the mobility of the supply and reconnaissance echelons of the artillery unit. Self-propelled artillery weapons are more maneuverable than towed weapons, but even the present SP artillery is too heavy to allow it to traverse deep snow (over 36 in.) in winter and muskeg in summer.

149. Positions

a. The problem of supply has a great influence on the selection of position areas. Positions are chosen not only for their tactical utility,

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but also for protection from the elements. Prior to occupation of a position, gun pits, traffic lanes, and snow parapets should be prepared; alternate positions should be selected early and prepared as time permits. Under winter conditions it will be impossible to dig in a position, but rather, parapets made of snow and ice will have to be erected. Positions should be continuously improved with primary emphasis on protection of personnel, equipment, and ammunition. If the situation is stable enough, group shelters are erected for the men. During periods of extreme cold, some type of shelter for gun crews and other personnel will have to be erected. Under these conditions, it may be necessary to relieve stand-by gun crews, guards, and outposts as often as every 15 minutes and allow them to return to heated shelters.

b. Camouflage discipline must be strictly enforced. Limited camouflage can be obtained by proper application of camouflage paint. Tracks left in snow cannot be effectively covered except by a fresh snowfall and even in the arctic there are many periods without snowfall. Therefore, if camouflage is to be preserved, it is essential that vehicles and troops move only by trails and roads that have been designated for use.

150. Observation

a. During winter months, good observation is limited to a few hours per day because of the short periods of daylight. Snow cover reduces depth perception and obscures ground features and landmarks. Reflection off the snow is intense and unless personnel are wearing dark glasses, continued exposure will result in painful snow blindness. Amber filters for observing instruments are required to reduce eye strain. Personnel operating observing instruments must be relieved frequently or provided with shelter. Both rotary and fixed-wing aircraft are excellent observation posts. Forward observer teams should be well trained in the use of over-snow equipment and in rock climbing technique.

b. Standard countermortar radar is extremely sensitive to low temperatures. Heat must be applied to the console before it will operate when temperatures are low. Heated shelter is required for plotting personnel.

c. Sound recorders are not affected by low temperatures. Microphones will function satisfactorily at low temperatures and when covered with 4 to 6 inches of dry snow. Time required to establish a sound base in arctic regions is normally four to five times that required under normal conditions. Heated shelter is required for computers and plotters when temperatures are below freezing or winds are high.

151. Artillery Fires

a. At times, especially during extreme cold periods and periods when temperature changes are sudden, ballistics of weapons and ammunition are affected. During extremely cold periods, K factors of 100 yards or more per thousand are not uncommon. Fuze quick is ineffective in deep snow as up to 90 percent of the fragmentation is absorbed by the snow cover. Air burst using either VT or mechanical time, is most effective against personnel in the open. Although VT fuzes are adversely affected by conditions of extreme cold causing an increase in the number of malfunctions, it is one of the most effective fuzes for the arctic.

b. Deep snow has an adverse effect on chemical shells. The canister from base ejection shell may be smothered in the snow. Phosphorus shell, although producing desired smoke, contaminates the area of impact with chemical particles which remain buried in the snow for several days.

c. During extreme cold, the rate of fire will be slow until weapons have warmed; this is especially true for weapons having a hydro-pneumatic type of recoil. Preparation of ammunition is slow when temperatures are low because of the reduced efficiency of personnel.

152. Communication

a. Radio is a rapid and reliable means of communication in the arctic. However, dry and wet cell batteries are seriously affected by extreme cold, both in operation and storage. At 0° F., the wet cell battery is only about 50 percent efficient. When exposed to a temperature of minus 30° F., the life of a radio battery is considered to be only 5 minutes.

b. Wire lines are normally restricted to existing trails and roads and are vulnerable to all existing hazards. Poles are broken by storms or uprooted by frost heaves. Wire laying by light aircraft is economical and should be employed whenever practicable. It is usually less time consuming to lay new lines than to attempt repair of old ones. Difficulties will be encountered when laying cold soaked telephone wire as the insulation will break about every 4 inches; therefore, wire must be stored in a warm place up to time of laying.

153. Antiaircraft Artillery

Self-propelled automatic weapons are more desirable for arctic regions than towed automatic weapons. The firing of weapons creates blanketing ice fogs in low temperatures and temporarily interferes with visual sighting. The 90-mm gun must be winterized for satisfactory operation and the mobility of this weapon is very limited.

Gun positions must be located on firm ground free of ice and snow. Fire control equipment is sensitive to low temperatures and external heat is required to warm up radar sets and directors.

Section V. MOUNTAIN OPERATIONS

154. General

The standard artillery units of corps and divisions can operate successfully in mountains although mountain warfare imposes special problems concerning mobility, fires, and tactical employment (FM 100-5). Personnel working in high altitudes perform their duties with marked loss of efficiency because the decrease of oxygen causes a need for more frequent rest periods. Commanders must consider this additional time factor when planning for mountain operations. This section summarizes those problems which require particular attention when artillery operates in mountains.

155. Mobility

The movement of artillery, in general, is restricted to roads and improved trails. This characteristic is emphasized in mountainous areas because the scarcity of adequate roads and trails greatly limits the choice of avenues of approach to the extent of canalizing the movement of artillery. In addition, the winding roads and steep slopes, characteristic in mountains, cause difficulties in turning towed weapons and in getting into and out of positions. Light artillery can sometimes be manhandled under these conditions. Pack artillery (FM 6-110) can be moved on unimproved trails and thus can be used well forward and in positions inaccessible to other artillery. Self-propelled artillery, although able to negotiate sharp turns more readily and capable of ascending and descending steep slopes, is hampered by tracks slipping on icy roads. This disadvantage may be partially overcome by the use of grousers.

156. Fires

a. Artillery fire is not as flexible in the mountains as in plains country because the choice of positions is restricted and masks are high. Since howitzers have arching trajectories, they are well adapted to mountain warfare. High-angle fire is employed frequently to reach over masks, behind crests, and into deep valleys. Adjustment of fires is difficult for targets located on peaks and reverse slopes. Guns, with their flat trajectories, cannot be used close to the front except in direct fire roles. Normally, guns are employed far enough to the rear to take advantage of an increased slope of fall. Some larger caliber weapons, however, may be moved forward for long-range interdiction fires.

b. The great majority of artillery fires in the mountains must be observed, especially close support and defensive fires. Observation parties must be enlarged to include porters for carrying equipment. Airplanes and helicopters increase the range of observation and permit searching of spaces into which ground observers cannot see.

c. Unobserved fires are generally unreliable in the mountains. Meteorological conditions change rapidly and registration corrections for high-angle fire do not hold true for very long periods. Effective transfer of fires is difficult since altitudes within transfer limits vary so greatly. Often it is necessary to fire a check round on a nearby target before bringing down fire for effect on the target.

157. Ammunition

Impact high explosive is very effective in rocky ground, scattering stones which in themselves become missiles. Experience has shown, however, that protracted bombardment with impact explosives of defensive positions in the mountains does not produce many enemy casualties. Artillery fires may be used to initiate rock or snow slides which block supply routes or engulf enemy defenses. VT and time fuzes are effective, particularly against troops held in reserve on reverse slopes. Smoke is used, but is difficult to control because of winds.

158. Targets and Target Location

a. Ideal artillery targets are passes and defiles which form bottlenecks on the enemy supply route. Interdiction of such targets is usual. Fire against targets on forward slopes and crests does not often produce decisive results. Since the defender is usually dispersed in small groups, mass fire of many artillery weapons is unusual and expensive.

b. Direct observation by either ground observers or army aviation is the most reliable means of locating targets in the mountains. Sound ranging in mountains is very difficult because of echoes and radar surveillance is adversely affected by ground clutter. High-performance aircraft have difficulty in performing observation missions while avoiding mountain hazards. Deep shadows and uneven illumination increase the problem of interpretation of aerial photographs.

c. Exaggerated defilade makes it difficult to locate enemy weapons. Much reliance must be placed on shell reports because of the inefficiency of radar and sound location in mountain. Map and photo study often discloses probable gun locations since the enemy is also restricted in his choice of likely gun positions.

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159. Control

Terrain compartmentation often requires the use of multiple columns in the attack. Small forces require artillery support and it may be necessary to decentralize control of artillery to provide support for all columns. General support artillery may be split in order to provide support for units that are separated by high ridges. Breaking up artillery tends toward decentralization, loss of control, and is not advisable unless absolutely necessary to provide fire support.

160. Communication

Main wire routes are restricted to the road and are susceptible to being interrupted by breaks caused by enemy artillery or friendly traffic. Wire laid cross-country is difficult to maintain and is often broken by rock and snow slides. Radio is used extensively. Antennas of very high frequency sets, either AM or FM, require careful selection of sites because of the line-of-sight characteristics of high frequency radio waves.

161. Antiaircraft Artillery

Mountains restrict the operation of low-flying aircraft so that directions of approach and flight patterns can often be predicted. Emplacement of antiaircraft weapons should take advantage of channeled routes of approach. Antiaircraft automatic weapons are useful against road blocks and caves.

Section VI. JUNGLE OPERATIONS

162. General

Jungle combat is termed a special operation primarily because inherent difficulties of terrain, climate, and visibility complicate the vital problems of command, movement, supporting fires, supply, and evacuation to the point where normal procedures must be modified, and specialized equipment must be employed. Training for this type operation must include thorough indoctrination on life in the jungle, stressing limitations, advantages, personal hygiene, and care of equipment.

163. Mobility

Jungle conditions impose greater restriction on the movement of artillery than those encountered in any other type operation. Suitable roads and improved trails are almost nonexistent away from settled areas. Roads must be constructed as the movement progresses, and must be maintained continuously as jungle growth will quickly

reclaim neglected or abandoned roadways. Special equipment is needed to insure the rapid and efficient construction of roads of the type that will withstand tropical conditions. Such equipment includes tractors capable of traversing boggy and swampy terrain; bulldozers for use in roadbuilding, as well as preparation of positions; and, in some cases, boats which are used to traverse rivers and flooded swamps, and to displace along shore lines and rivers.

164. Fire Capabilities and Limitations

a. As in mountain operations, the flexibility of artillery fire is reduced by excessive mask, scarcity of suitable position areas, lack of accurate maps, and restricted observation. High-angle fire will often be required to clear tall masks surrounding positions. Direct fire missions will frequently be required in defense of positions against ground attack. Heavy and medium artillery can be used in direct fire for destruction of cave and pillbox emplacements, while light artillery can be used to defoliate trees and natural camouflage to expose hidden emplacements.

b. Adjustment of fire on close-in targets is often conducted by sound, the observer listening for the whistle and burst of the shell and bringing the burst on the target by *creeping*. When such sound adjustments are used, data must be carefully checked at the fire direction center. Observers with adjacent units can assist in the adjustment by giving their sound sensings.

c. Under weather conditions normal to tropical areas, meteorological data are not subject to rapid change and metro corrections are reasonably accurate. However, maps are usually so poor that map data are not accurate; vertical control is often nonexistent. When properly registered, surprise unobserved fires are very effective.

165. Observation

a. Observation is extremely restricted by jungle growth and is often limited to the immediate vicinity of the observer. Observer parties must be well forward, often accompanying patrols, so that they can use their limited observation to best advantage and be aware of the location of forward elements. Parties must be large in order to carry equipment, lay wire, and provide security. Check points and known locations are rare and observers must use initiative in devising methods of spotting fire. The observer must know the slope of fall of the projectile and the height of the trees in the vicinity of the target to avoid bursts over friendly troops. Often, close-in targets can be engaged only through use of high-angle fire. On rare occasions, some observation advantage is gained from high trees and dominating ter-

rain. Air observation from army aircraft is efficient for location of distant targets, such as enemy batteries, troop concentrations, bivouacs, and boat movements, however, it is usually necessary for these planes to fly over enemy territory to gain information of specific targets. Even with limited observation, light planes are of great assistance to the artillery and should be employed whenever possible.

b. Artillery planes can be profitably utilized in jungle warfare, not only for adjusting fires but also for locating friendly lines, spotting targets for air strikes, delivering supplies to forward units, and acting as relay or control in artillery radio nets. Observers in planes can work together with ground observers in adjusting artillery. Often the ground observer can hear but not see the rounds fall although he can see the target, while the air observer can see the rounds but knows only the approximate location of the target. A combination of their sensing gives the FDC a better picture of the adjustment and speeds up the delivery of effective fire.

166. Survey

Survey is slow and difficult in the jungle. Control points are few and maps are poor. Since the advance of the infantry is slow, extension of survey can usually keep up with forward elements. Target area survey is usually very restricted, limiting most survey operations to position area connected by traverse to observers. Traverse legs are necessarily short and vertical control is usually extremely limited. Machete crews assist the survey teams.

167. Target Location

Patrols are the most lucrative source of target locations. Sound, flash, and radar may be used for location of targets, but they are restricted by tree canopy, slow survey, poor trails for moving heavy equipment, and necessity for clearing fields of operation for the radar sets.

168. Positions

There are few good gun positions in the jungle. Usually areas must be cleared with bulldozers and engineer power tools; this is especially difficult because arcs of fire must be large. In clearing fields of fire, care must be taken to disturb the tree pattern as little as possible to avoid disclosing the position to enemy air. In wet weather, roads into positions must be corduroyed and platforms built under the weapons. Weapons can be closer together than in open terrain in order to facilitate control and security.

169. Security

Whenever the tactical situation permits, the artillery should be located within the area of the infantry reserve to take advantage of the protection provided by the riflemen. Batteries should be close enough to each other to provide mutual protection. Each battery must establish a perimeter defense, and the defense systems of the batteries must be integrated into a battalion defense plan (FM 6-140). Security must be stressed also when displacing to new positions, since the jungle aids the enemy in preparing an ambush. The march security precautions discussed in FM 31-20 are applicable.

170. Ammunition

a. Supply and storage of ammunition is a critical problem in the jungle and requires constant effort and attention on the part of all concerned. Since many missions are fired close to friendly troops, sorting of ammunition must be carefully supervised to insure uniform lots. Ammunition must be stored with care to protect it from moisture as exposed powder deteriorates rapidly in the humid jungle.

b. White phosphorous smoke is very often used during adjustment to facilitate observation and to mark targets for air strikes. Large-scale smoke screens are not as common as in open terrain. Proximity fuze shell and time fire are generally ineffective because heavy overhead growth reduces the fragmentation effect. Quick fuze produces tree bursts below the canopy and is especially effective in clearing out snipers. Delay fuze, activated by the trees, usually gives a ground burst similar to that obtained by quick fuze in open terrain. The proportion of delay fuze to quick fuze is usually greater than normal. Heavy undergrowth smothers the shell burst, limiting the burst radius; therefore, artillery fire can be brought in closer to friendly front lines, though more ammunition must be used to obtain good area coverage. Care must be taken to insure that tree bursts do not occur over friendly troops.

171. Antiaircraft Artillery

Employment of antiaircraft artillery on a surface mission is influenced by the necessity for clearing fields of fire and the lack of good roads. Automatic weapons are very effective against hillside defenses.

172. Communication

Radios are used extensively by forward observers and survey parties; relay stations, such as aircraft, are normally required. Telephone lines are laid whenever possible, and forward switching centrals are often installed. Wire crews must be protected while laying and repairing wire, and extra men are required to act as porters.

~~Section VII. DESERT OPERATIONS~~

173. General

The principal problems confronting artillery engaged in desert warfare (FM 31-25) are observation, maintenance, and supply. Desert terrain varies widely from low, flat, sandy plains to high, rocky, mountainous areas (FM 100-5). Temperatures also vary from torrid to subzero according to the latitude and altitude. Arid climate, with lack of vegetation, is the only common characteristic. Therefore, artillery tactics and plans must be varied to suit the conditions of terrain and climate.

174. Observation

a. Terrestrial observation of artillery fires in hot, flat, sandy desert areas is very difficult because of heat waves, mirage, lack of elevated positions, and frequent dust storms. Distances observed over flat terrain are deceiving and are usually underestimated. The absence of identifiable landmarks reduces the value of maps. Air observation, while much better than ground observation is still hampered by the above factors.

b. Observation in mountainous desert areas is subject to the limitations discussed under mountain operations.

175. Maintenance

Frequent dust storms and sand storms require a constant, intensive maintenance program to protect all materiel from the abrasive action of the fine dust and sand. Wear on gun tubes, slides, and all bearing surfaces, and scouring and pitting of optical instruments is greatly increased by exposure to these conditions.

Section VIII. COMBAT IN TOWNS

176. General

As most towns are readily by-passed without materially affecting the commander's plan of maneuver, only those which occupy key terrain or those which constitute islands of resistance so large as to be serious threats to future operations will normally be attacked. Outlying areas where there are good fields of fire become the first line of defense. This line may be fortified with anything from hastily prepared positions to mutually supporting concrete emplacements. If these positions are penetrated, the defender must fall back to the cover of city buildings. Additional information relating to combat in towns is contained in FM 6-101, FM 31-50, and FM 100-5.

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177. Artillery Support of the Attack

a. After the town has been isolated, the artillery commander must prepare to support the two remaining phases of the attack. In supporting the second phase of the attack, which is to penetrate the defender's initial position, artillery will be centralized and operate in a normal manner. The artillery commander must have artillery capable of destroying fortifications and of long enough range to neutralize enemy artillery and provide interdiction fires. In the second phase, the forces holding the town will normally have good observation, thus forcing friendly troops to displace at night or along concealed routes. With the successful completion of this phase the artillery must displace quickly to support the third phase of the attack.

b. The third phase of the attack, which consists of the advance through the town, will often require the infantry commander to decentralize his command into small units which must attack through separate corridors of the town. This action may necessitate decentralization of the artillery, particularly the direct fire elements and direct support artillery. Fires for general bombardment of the city are of doubtful value since they clutter the streets with rubble and impede movement without materially destroying the defenses. Observation is usually poor and the artillery must depend almost entirely on forward observers for conduct of fire. Direct fire artillery should be armored and of large enough caliber to destroy designated buildings. Direct support artillery must be acapable of high-angle fire and since opposing forces are in such close proximity it will often be necessary to withdraw the attacking forces while artillery concentrations are being fired. The greater part of indirect fires, however, will be precision fires.

178. Artillery Support of the Defense

In the defense of towns, artillery is so emplaced that it can fire against any attempted envelopment of the town or against hostile forces within range that are attempting to by-pass the town. It must also be able to mass the bulk of its fires on the critical avenues of approach and to fire final protective fires in the form of barrages covering close-in approaches such as streets, open areas, and areas containing lightly constructed buildings. If the enemy makes a penetration, the bulk of the artillery should be able to mass its fires against this penetration and support the counterattack. Generally, the artillery is centrally located in rear of the town and echeloned in depth.

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Section IX. ARTILLERY IN RIVER CROSSINGS

179. General

The role of artillery in actions at river lines differs little from normal operations. To maintain secrecy and aid in deception, a minimum of the artillery initially occupies advanced concealed positions from which registration may be conducted. A complete discussion of river crossing operations is contained in FM 31-60.

180. Support of the Crossing

a. The crossing is supported from positions as far forward as secrecy permits and which are occupied under cover of darkness at the latest possible time prior to the attack. When it does not interfere with their primary mission, field artillery support of the crossing is augmented by tanks and antiaircraft weapons. Antiaircraft artillery protects the most important bridge and crossing sites.

b. Field artillery *may* begin to displace to the far bank when the infantry has secured the first phase objectives (FM 100-5). The mass of the artillery, however, crosses when it is determined that continuous effective support can be delivered from the new position. Some antiaircraft artillery crosses early in order to establish antiaircraft defenses for bridges, fords, and similar enemy air objectives.

c. Prior to, during, or immediately after the crossing, artillery may be required to—

- (1) Furnish illumination either with searchlights or illuminating shell.
- (2) Smoke enemy observation to conceal bridge construction.
- (3) Screen movement noises of the attack force during crossing by real or feint preparation fires.

181. Artillery Support of a Defense at a River Line

The organization and disposition of artillery to support the defense of a river line is dependent upon the type of defense planned.

a. In a position type of defense, artillery is disposed in depth, capable of massing fires on critical points in the enemy's rear areas as well as on probable crossing sites. Elements of the artillery may be disposed on the far shore in support of security forces. Of particular importance in this type of defense is the necessity for coordination to insure the withdrawal of the artillery with the security forces across the river before the bridges are destroyed.

b. In a mobile type of defense, artillery is employed to cover all probable crossing sites. When the main crossing is disclosed, the bulk of the general support artillery displaces to previously selected and

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prepared positions to support the counterattacking force. Emphasis is placed on maintenance of probable routes of displacement for artillery supporting the counterattacking force, traffic control, and preparation of fire support plans and positions for possible counterattack areas.

Section X. COASTAL FRONTIER DEFENSE

182. General

Coastal frontier defense includes all measures taken by the armed forces to provide protection against any form of attack at or near the shoreline and within the zone immediately to the rear. The basic consideration of the defending force is the defeat and destruction of the invading force before it lands or while it is attempting to gain a beachhead. The coastal frontier defense mission of the Navy is to meet and defeat the enemy while he is still at sea; of the Air Force to counter enemy air action and carry the offensive to the enemy both at sea and on the land; of the Army to meet and defeat the enemy prior to landing or after he has landed. When artillery is employed in coastal frontier defense it will usually be as part of a force of all arms, although it is possible that it may be required to act alone or in conjunction with air or naval forces.

183. Artillery Employment

Artillery as a member of a combined arms force will be primarily concerned with destroying hostile landing waves before they can gain a lodgment on the shore and supporting ground troops in the reduction of any beachhead which may be established. Field artillery gunnery techniques are described in FM 6-40 and other considerations incident to attack of waterborne targets are described in FM 44-4.

CHAPTER 10

TARGET INTELLIGENCE

Section I. GENERAL

184. General

a. This chapter outlines intelligence procedures which may be used to locate, confirm, and describe surface targets for attack by available means of fire support. The processing of all combat information by all artillery echelons is essential in developing target intelligence to be used by any fire support means. The scope of this chapter is limited to a consideration of target intelligence at artillery echelons above battalion. FM 30-5 covers all combat intelligence. Use of target intelligence in target analysis is described in chapter 11.

b. Target intelligence is knowledge of targets acquired by the collection, processing, and dissemination of all available information pertaining to possible or actual targets. Target intelligence is a part of combat intelligence. It involves the prompt reporting, timely recognition, and accurate determination of characteristics (par. 206) for targets whose attack will assist the supported unit in accomplishing its mission and it includes surveillance of such targets both before and after their attack by fire (par. 186). Adequate and accurate target intelligence is a requisite for target analysis (ch. 11). The artillery S2 (par. 27) directs the artillery's target intelligence efforts.

c. Full exploitation of the artillery fire power available to a commander is dependent upon the volume, coverage, and effective use of available target information and intelligence. Unless all available target information is obtained and used, supported units will be unable to obtain the maximum benefit from the fires of their supporting artillery. The continuous interchange between representatives of all participating agencies in the FSCC of all information pertaining to target intelligence, when added to the information obtained through the artillery's own means, contributes not only to the fulfillment of common intelligence needs, but also to the end result of target intelligence: delivery of effective fire against the enemy.

185. Impact of New Weapons on Target Intelligence

Exploitation of the increased fire power available to the commander is facilitated by increasing the volume, timeliness, scope of coverage, and speed of reporting target information.

a. Employment of long-range artillery extends the effective range of artillery beyond the normal observing range of ground observers and organic aircraft. Emphasis must be placed on obtaining target information in greater depth.

b. The employment of artillery, including atomic weapons, requires consideration of the nature of targets in order to determine suitability for attack.

(1) Atomic bursts can neutralize areas of the order of millions of square yards. Information leading to the development of targets suitable for attack by atomic weapons often will be derived from the evaluated summation of many reports.

(2) Concentrations of enemy personnel and materiel of sufficient size to justify an atomic attack will rarely exist for long period of time. The reporting and processing of target information must therefore be rapid and timely.

c. Direction of the target collection effort must be aggressive and continuous in order to exploit present and future weapon capabilities. Communication facilities must be efficiently utilized to insure that target information is disseminated by the most rapid means.

186. Post Attack Analysis

a. Following attack of a target an analysis is made to determine insofar as possible the accuracy and effectiveness of the fires and of the target locating sources and agencies used. Whenever possible, the casualties, amount of damage, and effect upon the morale and efficiency of the enemy caused by the fires should be determined. This information is necessary as a basis for deducing the comparative effectiveness of different types of weapons, techniques, and ammunition; the strength and types of enemy defensive works; the effectiveness of enemy ruses and methods of camouflage; enemy tactics as affecting fire planning; the relative importance of targets; and effect of weapons on enemy capabilities. By building up experience tables based on actual results, the artillery officer is able to increase the effectiveness of artillery fires.

b. In general, the information for post attack analysis can be obtained from the same sources and agencies that were used in obtaining the target information initially; however, the best information usually is obtained from comparative photo interpretation. Such other means as surveillance, close inspection of the target area after capture, interrogation of captured survivors, and studying captured records, reports, diaries, and letters may also be used.

c. Each arm and service is responsible for post attack analysis of fires delivered by them. They request necessary assistance and in-

formation from the other arms and services through normal intelligence channels.

d. The artillery S2 receives reports of post attack analysis from the artillery agencies making the analyses. Pertinent data from these reports are entered on the appropriate target file cards. The information obtained from these analyses is compared by the artillery S2 and deductions are made as to the comparative effectiveness of the artillery weapons, techniques, and ammunition of the artillery in the attack of specific types of targets. Valuable information regarding enemy doctrine and practices frequently may be deduced. The information is used in informing the commander of the effects of artillery fires delivered in support of the force.

187. Counterbattery and Countermortar Responsibilities

a. Division artillery has responsibility for the supervision of countermortar functions within the division (pars. 270-274). Mortars, because of their mobility and relatively short range, frequently are fired from temporary positions and then are displaced rapidly to avoid counterfire. Consequently, speed in obtaining, evaluating, and disseminating countermortar information must be emphasized.

b. Corps artillery has responsibility for counterbattery functions within the corps sector (pars. 265-269). A clear distinction between countermortar and counterbattery functions is not always possible or desirable. Therefore the most appropriate means available must be utilized for locating and attacking the weapon.

c. Army artillery may process information on enemy long-range artillery or missile launching sites, but normally separate processing of counterbattery information is not performed at army level.

Section II. COLLECTION OF TARGET INFORMATION

188. General

Collection of target information is accomplished by continuous planning and systematic direction of the collection effort. Effective utilization of the sources and agencies available for the collection of target information is dependent upon complete knowledge by the artillery S2 of their capabilities and limitations. This planning and direction includes—

a. Appropriate orders to agencies under the artillery commander's control and appropriate requests to higher artillery echelons.

b. Coordinating, through normal chain of command, the efforts of intelligence personnel of subordinate units to insure the constant flow of information to the FDC (AAOC) and fire support coordination center.

- c. Planning with the G2 for use of intelligence agencies not under control of the artillery commander.
- d. Requesting through available channels the use of intelligence agencies not under control of the ground commander with particular reference to tactical reconnaissance aviation.

189. Sources and Agencies

a. The artillery S2 has available a large number of sources and agencies for the collection of target information. The sources and agencies discussed in the following paragraphs are particularly remunerative. A complete discussion of intelligence sources and agencies is contained in FM 30-5. The width and depth capabilities of the intelligence sources and agencies available to artillery S2's increase at higher echelons.

b. The army artillery S2 has, in general, the same sources and agencies available for the collection of target information as the corps artillery S2. The primary interest of the artillery S2 at army level is in the original determination of distant targets. This information is obtainable primarily from tactical reconnaissance aviation and through G2 channels because the artillery has no organic means of obtaining this target information.

190. Observation

The means of observation available to artillery S2's include artillery observation posts, forward observers, air observers, radar ranging, sound ranging, and flash ranging. Coordination of these means is discussed in paragraph 65.

191. Reconnaissance by Fire

a. Reconnaissance by fire is used to find targets, when enemy activity is so restricted as to make little or nothing visible. It is a method of probing suspected areas by fire to produce enemy reaction. Available observation is coordinated to detect any signs of activity that result from the fire.

b. In some situations reconnaissance by fire may be utilized to determine the nature of a fortification. This must be closely coordinated with observation and the comparison of air photographs. Firing on the suspected areas may strip away natural cover, earth, and camouflage. This fire may establish the presence and thickness of concrete or armor, the outlines of the fortified structure, the location and direction of fire of embrasures, the system of tactical coordination, and the location of strong points.

192. Patrols

Patrols are a useful agency to collect information, providing continuous coverage of the enemy front both by observation and by capture of prisoners. In the detection of targets suitable for attack by atomic means deep patrolling may assume great importance. All reconnaissance personnel must be thoroughly trained and indoctrinated in recognizing indications of tactical targets and reporting them. Patrol missions are coordinated by G2.

193. Shelling Reports (Shelreps) and Crater Analysis

a. Timely shelreps and crater analyses are essential to the conduct of efficient counterbattery and countermortar measures. They not only assist in locating enemy weapons; but, in addition, furnish valuable data as to when and where the enemy is firing; which weapons are active; number, caliber, and type of enemy weapons; zones of enemy fire; and effectiveness of enemy fire. Intelligence derived from shelreps and crater analyses may also define the sectors which must be searched by other means. The effectiveness of shelreps depends chiefly upon their accuracy and completeness, speed of transmission, and the volume received. The indoctrination of all troops and, in particular, the training of specialist teams in making shelling reports and in analyzing craters is dependent upon the energy and aggressiveness of commanders at all echelons. Chapter 16 contains detailed information on shelreps and crater analysis.

b. To evaluate crater analysis reports properly, the artillery S2 must know the conditions under which the analysis was made (ch. 16). Considerations, such as those listed below, effect both the evaluation and the preparation of crater analysis reports.

- (1) The reporting personnel's proficiency in crater analysis.
- (2) Type of terrain in the shelled area. This includes a knowledge of the irregularities of terrain, soil conditions, and the vegetation that might deflect the projectile upon impact or obliterate the signs of the burst.
- (3) The angle of impact of the projectile. The greater the angle of impact, the less remarkable are the characteristics of the crater and the less the capability for reliable analysis.
- (4) Defacing the craters by the effects of other projectiles. In a shelled area, selection of the crater to be analyzed is important; a representative crater should be selected and two or more of the methods enumerated in chapter 16 should be employed in conducting the analysis. An average of the results obtained from separate methods of analyzing the same crater usually will furnish the most reliable information

concerning the direction from the crater to the offending weapon.

(5) Effects of drift and weather conditions. This involves a knowledge of the weather conditions at the time of firing as well as a knowledge of the enemy materiel and its characteristics.

194. Communication Intelligence

Communication intelligence by locating enemy transmitters and by monitoring enemy transmissions is a remunerative means of discovering tactical targets. It is available through G2 channels from communication reconnaissance personnel of the Army Security Agency. This form of intelligence must be continuous and must be so coordinated as to be readily available to division, corps, and army battalion S2's.

195. Tactical Air Reconnaissance

a. Tactical air reconnaissance furnishes information concerning enemy troop concentrations and movements, location of enemy artillery, reserves, and supply points, as well as other items of enemy information. Tactical air reconnaissance is used for the following purposes in expediting fire support:

- (1) To provide photographic and electronic coverage of areas and targets.
- (2) To provide and maintain visual surveillance of enemy and friendly activities.
- (3) To direct the adjustment of long-range artillery and naval gunfire.
- (4) To assist in the destruction of hostile forces and installations by directing fighter bomber attacks.
- (5) To provide local weather reconnaissance as required.

b. The advent of long-range artillery, to include guided missiles and rockets, and atomic fire power accentuates the requirement for deep reconnaissance. This requirement is normally met by tactical air reconnaissance units operating in conjunction with the field army. This is the principal agency available to the army commander for location of distant targets.

196. Photo Interpretation

The effectiveness of photo reconnaissance, once the photo missions have been flown, depends on the rapidity with which the film is processed, edited, interpreted and the information disseminated. It is good practice for some corps artillery intelligence personnel, includ-

ing artillery photo interpreters to be located and operate at JAPC. It is therefore necessary that staffs at all echelons exercise initiative in forwarding the results of photo interpretation and, when required, photos, to all interested subordinate units with the least practicable delay.

a. Immediate photo interpretation of all photographs taken by the air forces is performed at Joint Air Photo Center (JAPC) and the resulting intelligence is disseminated through the air-ground operations communication system. Negatives of photos requested by army units are turned over without delay to the engineer reproduction organization at JAPC for preparation of prints. Prints are distributed by army units. Detailed interpretation to include comparative interpretation is a prolific means of locating targets at division artillery and corps artillery levels.

b. Division, corps, and army artillery S2's may utilize organic army aviation sections for limited photo coverage depending upon the availability of photographic equipment. Such photo coverage consisting principally of obliques and uncontrolled verticals is limited in depth.

197. Clandestine Agencies

Greater depth of target information can, in some cases, be obtained by clandestine means. Such means are normally under control of G2's at army and higher echelons. Close coordination between G2's and artillery S2's is required to insure that agents are properly briefed as to the nature of and indications required for target intelligence.

Section III. PROCESSING OF TARGET INFORMATION

198. General

a. *Definition.* Processing is the means by which information is transformed into intelligence. The three basic elements of processing are recording, evaluation, and interpretation. After information has been collected, the intelligence officer must sort and group it by subjects in order to facilitate comparison and study; he must evaluate it in order to determine its pertinence, reliability, and credibility; and he must interpret it to determine its significance.

b. *Procedures.* Each intelligence officer must adapt procedures to the needs of his unit. Simplification of method is important and desirable. The maintenance of records must always be subordinate to the assembling and interpreting of information and to the producing and utilizing of intelligence. An intelligence officer must not allow himself to be engulfed in a mass of paper work. The system of processing should be as simple as possible so that resultant informa-

tion produces intelligence that is concise, free from irrelevant matter, and ready for immediate use (FM 30-5).

199. Recording

Recording is the systematic arrangement, sorting, grouping, and recording of information by type so that items of the same kind may be kept together for convenience of comparison, study, and reporting (FM 30-5). In recording, target information usually is separated into two categories, hostile battery (hostile mortar) information and general target information. For recording techniques see chapter 16.

200. Evaluation

Evaluation is the critical and systematic analysis of an item of information to determine its pertinence, reliability, and credibility.

a. *Pertinence of Information.* Pertinence refers to the need for the information, either by one's own unit or by some other unit. The need determines whether the information will be further evaluated and disseminated. Immediately upon receipt, information is examined to determine whether it is of value and to whom; this involves a consideration of the following points:

- (1) *Is it information of the enemy or of the characteristics of the area of operations?* The answer to this question must be affirmative or the information is of no use in the process of developing intelligence. Information of friendly forces is passed to the artillery operations representative for processing (ch. 15).
- (2) *Is it information of value to this unit or to higher, lower, or adjacent units?* To answer this question properly, the artillery S2 must be aware of the specific items of information of value to his own unit and must know at least the general types of information which are of value to higher, lower, and adjacent units. The fact that a certain item of information is of no value to his own unit should not lessen the interest with which the artillery S2 examines the information to determine whether it may be of value to some other unit. When in doubt as to whether an item of information may be of value to another person or unit, assume that it is.
- (3) *Is it information needed immediately and, if so, by whom?* The nature of the information usually indicates the urgency of the action to be taken on the basis of the information. The location of friendly units with respect to a particular target usually indicates the persons and units that may need the information immediately. Information of such urgency

that it is needed at once by another person or unit is disseminated to that person or unit immediately. If time permits, the remainder of the processing procedure is completed before the information is disseminated; if not, it is completed after dissemination of the information and any additional resultant information also is disseminated to the appropriate persons and units.

(4) *Is it information of future value?* Information of possible future value should be recorded in such a manner that it will be noticed at the time when it may be of value. Thus, a certain target may not be sufficiently important to warrant firing upon it with any of the available fire support means; yet, the target may be plotted on the intelligence map since it and many similar targets, together with the more important targets that are fired upon may delineate a target worthy of attack by atomic or other extremely powerful means.

b. *Reliability.* Reliability pertains to the dependability, the worthiness of belief, of the source and the collecting agency. Information obtained from an agency or source of questionable reliability or from an untested source or agency usually should be corroborated before it is used as a basis for action. A careful record should be maintained showing all data pertaining to the reliability of the various sources and agencies. Most of the data in this record must be obtained by experience. The principal questions which must be answered in estimating reliability are as follows:

(1) *To what extent is the source or agency accurate and reliable?* When information is obtained by a device such as radar, the accuracy of the source usually can be estimated closely if the type of equipment used is known. When the source or agency is an individual, experience with that particular source or agency or with similar sources or agencies usually is the best guide.

(2) *Has the collecting agency sufficient training, experience, and ability to report accurately the information in question?* The artillery S2 should be suspicious of technical information obtained from a source or agency that has not had the technical training usually required to develop the information reported. Thus, in the case of a shelrep, it is necessary to know the state of training, the experience, and the ability of the shelling report team which prepared the report. The ability of individuals to obtain nontechnical information varies widely also. For example, it is known that the ability of observers to estimate distances varies widely depending upon

the visual acuity of the individual, his training, the physical aids (field glasses, range finder) that he has used to aid in the estimation, and the length of time that he has been studying the target area.

(3) *Under conditions existing at the time (time and space, means employed, visibility, etc.), could the information have been obtained?* This question must be answered carefully with respect to each item of information regardless of the source. It is highly unlikely, for instance, that an observer aided only by field glasses could observe enemy activities at a distance of 10,000 meters at night.

c. *Credibility.* Credibility pertains to the information itself and must be determined separately from the reliability of the source or agency. This determination is facilitated by answering each of the following questions with respect to each item of information.

(1) *Is the purported fact or event at all possible?* Occasionally it may be concluded that a purported fact or event is not possible; however, if the source of the information is at all reliable, extremely great care must be exercised in making a positive determination in this regard. The history of each era recounts examples of an enemy force defeating its opponent as an immediate reward for having accomplished a supposedly impossible feat such as assembling a large force without its being detected, climbing a cliff thought to be unscalable, or moving large units through apparently impenetrable jungle or impassable swamp.

(2) *Is it corroborated by other information from a different source?*

(a) Separate sources may observe the same target, report its nature and location and thus corroborate the information submitted by each other. For example, if an air observer and a ground observer each observed a group of tanks at a particular location at the same time, they would submit separate reports of this information. When the second of these reports was compared by the artillery S2 with the first, the second report should corroborate the existence of and the location of the tanks.

(b) It is not always necessary, however, for a target to be located by a second source or agency in order to be considered a confirmed target. When, owing to the proven reliability of the source or agency, it is assumed without further question that the target is as reported, the target may be classified as a confirmed target. The correctness of

such an assumption depends to a large degree on the judgment and experience of the artillery S2 who makes it.

(3) *In what respect does it agree or disagree with available information covering the same subject; particularly that known to be correct?* To the extent that information agrees with other information already on hand, it tends to corroborate the information on hand. When new information is inconsistent with or contradicts information on hand and the information is of sufficient importance, a recheck is obtained to ascertain the accuracy of both items of information. Information that agrees with other information known to be correct may require little corroboration to be accepted as accurate. In all cases, the exact items of agreement or disagreement must be isolated.

(4) *If it is at variance with information from another source or agency, and the conflicting items cannot be reconciled, which information is more likely to be correct?* When conflicting information is received, the reliability of the sources or agencies from which the information was obtained and the other questions pertaining to credibility must be examined closely. Conflicting information presents one of the most difficult problems in the production of accurate intelligence. Consequently, when items of information cannot be reconciled, a detailed study should be made of the conflicting items and of all related information, and of the origin of the information. Even after a decision is reached as to which item probably is the more correct, it is advisable to retain for possible future use the information that is considered the less correct.

201. Interpretation

Interpretation is the final step of processing. It is the critical and systematic analysis of evaluated information to determine its meaning, importance, and significance in light of intelligence already at hand and conclusions drawn therefrom. New information may add to, confirm, or refute the current picture of the enemy situation. Whereas the areas of agreement and disagreement of new information with information already at hand are determined as a part of evaluation, the meaning, importance, and significance of those areas of agreement and disagreement are estimated as a part of the interpretation. Correct interpretation will lead to accurate conclusions concerning target information. Proper interpretation of target information by the fire support coordinator is essential to the employment

of effective fire support. Such interpretation may dictate which means of fire support are required to cause the desired effect upon the target. Interpretation of target information is especially significant when the use of atomic fire is either contemplated or recommended based on the interpretation made by the fire support coordinator.

Section IV. DISSEMINATION

202. General

Dissemination is the timely distribution of information and intelligence in suitable form and in sufficient detail to all authorized persons and units to which it may be of interest.

a. Disseminated information should be pertinent, concise, accurate, and clear. The recipient should not be burdened with unnecessary or irrelevant details or with illogically presented information. Overlays and marked maps frequently are an excellent means for precise portrayal of target information. Each form and message used to disseminate target intelligence must be examined carefully to insure that the information is presented as clearly and concisely as possible and that it cannot be misunderstood.

b. Dissemination must be prompt.

(1) Information requiring immediate action should be sent without delay to those units or persons which can take necessary action, and then to units having an interest in the information but which take no immediate action. Information which does not demand immediate action is disseminated in accordance with the appropriate communications priority. The urgency with which items of information must be disseminated is determined when the information is evaluated (par. 200).

(2) Target information must be disseminated, when appropriate, to higher, lower, and adjacent headquarters in time to permit proper target analysis and for the fire support agencies affected to take the required action. It must be disseminated to the supported unit G2 (S2) in time to be incorporated appropriately into the general combat intelligence picture.

c. Dissemination must be complete. The artillery S2 must insure that all authorized persons and units which have an interest in an item of information are furnished the information. If necessary, a check with those persons and units should be made to make certain that they have received the information. The persons and units that are interested in each item of information are determined as a part of the process of evaluation.

~~RESTRICTED - Security Information~~

203. Methods and Channels for Dissemination

- a.* Target intelligence is disseminated by whatever methods are most suitable at the time, such as, electronic devices, conferences, messages, or intelligence documents (ch. 16).
- b.* Representatives of the fire support agencies and of the supported unit keep informed of and transmit to their parent units all available information.

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CHAPTER 11

TARGET ANALYSIS

204. General

a. Target analysis is the examination of potential surface targets to determine their military importance, their relative priority for attack, and the capabilities of available weapons for such attack. It is performed for targets of opportunity as well as for targets for which prearranged fires have been planned. The length of time and amount of detail involved in making a target analysis depend upon the amount of information available concerning the target, availability of means of attack, the degree of coordination required, and the urgency for attack of the target. The analysis may consist of a rapid mental calculation such as would be performed by a field artillery battalion S3 in analyzing a typical target for light artillery; or it may take the form of a detailed written analysis when prearranged attack by atomic means is considered. Proper target analysis will assist the commander in achieving optimum tactical effect in the attack of targets.

b. The suggested form for target analysis (app. II) follows, in general, the form for the commander's estimate of the situation (app. II). Since the MISSION for target analysis is always the same, i. e., to obtain maximum effect on the target within weapon's capabilities, this paragraph of the commander's estimate of the situation has been omitted from the target analysis form. The target analysis form should be used as a checklist for analyzing all targets. When it appears after such a brief analysis, that a target may be suitable for attack by atomic means, a detailed, written target analysis should be prepared in conjunction with the general staff of the supported force. The specific target analysis form and procedures for the tactical use of atomic weapons is indicated in other appropriate classified training publications. The general process of target analysis is outlined in figure 10 and the principal factors affecting each step in this process are discussed in the following paragraphs.

205. Plan of the Supported Unit

a. The plan of the supported unit is the primary consideration in making a target analysis. All supporting fire power must be planned

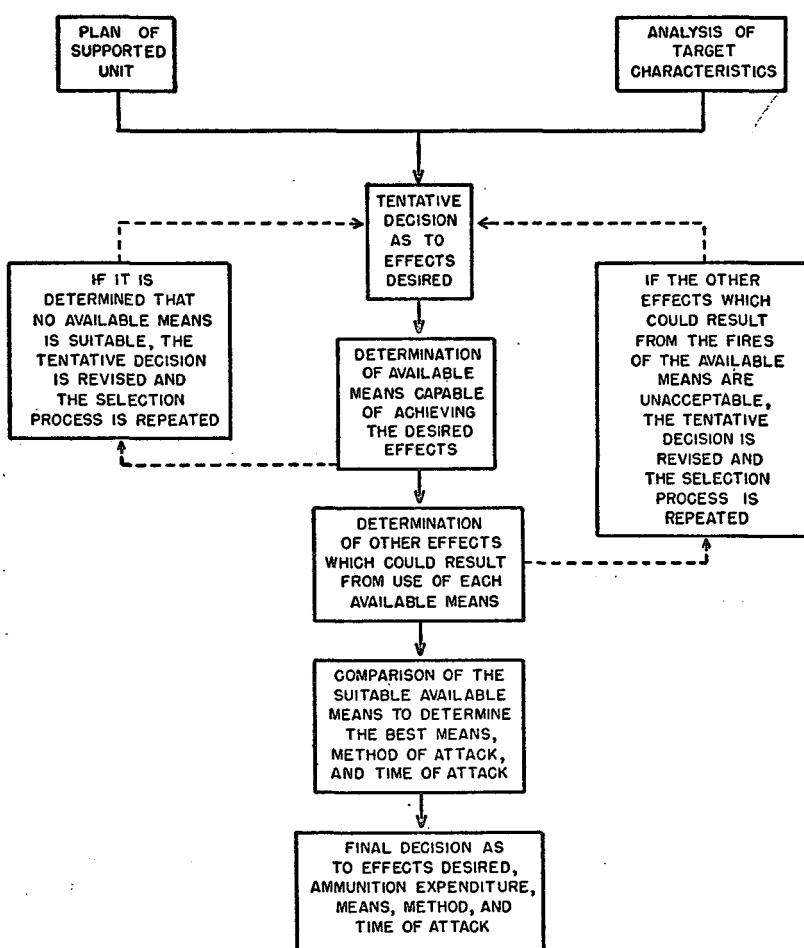


Figure 10. Process of target analysis.

to contribute the maximum to the success of the operation. The nature and characteristics of a target do not in themselves dictate the method of attack. The importance of the target as measured by its capability to influence the operations is also an important consideration.

b. Because of the potential effect of atomic fire power, the integration of atomic fires with operations assumes great importance. Whenever possible, the tactical advantage gained through the use of atomic weapons should be fully and expeditiously exploited through maneuver. For this reason the force (supported) commander will reserve the final decision for the employment of atomic weapons. This deci-

sion is based on the target analysis made under the supervision of the artillery commander in conjunction with the general staff of the supported force.

206. Target Characteristics

Characteristics of the target include all features of the target and target area that may influence the decision to attack the target. Targets about which little is known may and often should be taken under fire. However, the more that is known about a target, the greater is the likelihood that the target will be suitably attacked. Information about target characteristics should be more complete than that usually obtained from artillery forward observers in connection with fire missions. Full use of all available target intelligence (ch. 10), should be made when conducting target analyses. The artillery intelligence representative in the FSCC is responsible for ascertaining these characteristics, for making the necessary deductions pertaining to their capabilities, and for recommending to the fire support coordinator the relative priority of each target for attack. The principal characteristics considered are listed below.

a. *Nature of the Target.* The nature of the target is the type, number of personnel or amount of materiel comprising the target, the size and shape of the target, its vulnerability to attack, and its recuperability from attack.

- (1) *Target description.* The target description is a delineation of the type of object or objects comprising the target (personnel, materiel, terrain features, etc.), the numbers of personnel and their organizational designation, the quantity of materiel, and the activity in which they are engaged. The target description must be as correct and in as much detail as possible since it is the foundation of the entire target analysis.
- (2) *Size and shape.* Knowledge of the size and shape of the target is essential to selection of a suitable delivery means. This is especially true in the case of large targets, and of unusually shaped targets, and is of particular importance for targets suitable for attack by atomic means. For large targets it may be necessary to ascertain the area boundaries as well as the target center.
- (3) *Vulnerability of the target.* Because of previous experience with similar targets, frequently the type of target describes its general vulnerability to attack. Considerations include—
 - (a) *Type of construction.* The vulnerability of the target is influenced directly by its construction; thus it requires more fire power to destroy a reinforced concrete bridge than a

wooden one. Further, targets made of flammable materials are more easily destroyed than are those made of fire resistant materials.

- (b) *Density and distribution.* Density and distribution are of particular importance in describing large area targets. The density of troops and materiel in the target area is essential information for estimating the probable effects of fires. The distribution of the elements of the target is significant in determining the center of mass of the target, which may vary considerably from the geographical center of the target. The target's center of mass directly influences the centering of fires on the target.
- (c) *Enemy discipline and morale.* Well disciplined troops and those with high morale are less affected by being fired upon than poorly disciplined troops and troops having low morale. This is a consideration in deciding on the amount of fire power to deliver when attempting to effect neutralization of enemy troops. To obtain this information it is usually necessary to know the identity of the troops comprising the target.
- (d) *Mobility.* Rapidly moving targets are more difficult to attack by fire than fixed targets. In addition, targets possessing mobility often are able to move into hiding or disperse, thereby frequently providing only a transitory target. The mobility of the target is of particular importance in determining the time of attack and the means to be employed.
- (e) *Cover.* The type and amount of cover protecting the target has a decided influence on the means to be employed, the direction of attack, and the amount of fire power required to obtain the desired effect upon the target.

- (4) *Recuperability of the target.* The ability of the enemy to satisfactorily repair or replace the target after attack, and the length of time required for such repair or replacement should be estimated. The nature of the target and the means known to be available to the enemy for repair or replacement are the basis for this estimate. The recuperability of the target is especially important in determining whether or not to attack a target, the desired effect upon the target, and the time of attack.
- (5) *Proximity to other installations.* The target's position in relation to friendly troops, to other targets, to enemy installations protected by the Geneva Convention, and to places pro-

tected by instructions from appropriate commanders must be considered.

b. Location of the Target.

- (1) *Target location.* Target location means the geographical location and altitude of the target. The target location has a direct influence upon the selection of a delivery means and, at times, upon the decision as to whether or not fires will be delivered.
- (2) *Accuracy of location.* The probable accuracy of the target location should be evaluated. The amount of ammunition required for the attack of accurately located targets is dependent upon the accuracy of the delivery means and the effective radius of the burst with regard to the target being engaged. Fire power of limited availability ordinarily should not be expended on indefinitely located targets when using unobserved fire.

c. Terrain and Weather.

- (1) *Terrain.* Terrain in the target area has a direct bearing on the vulnerability of the target. Rugged terrain affords considerable natural cover, necessitating the expenditure of more ammunition than would be required to obtain an equal effect in even terrain. Targets that are well defiladed by terrain sometimes can be reached only by high-angle fire or by aircraft. Certain terrain provides complete defilade from attack from some angles of approach, but not from others, thereby influencing selection of the means of attack and frequently necessitating movement of a weapon to a position from which it can deliver effectively the desired fire. In this regard, aircraft, naval ships, and artillery possess flexibility in that order. The nature of the vegetation in the target area should be considered in the selection of ammunition. Information as to relief, surface soil conditions, and vegetation in the target area is essential when considering atomic attack. Uneven terrain frequently limits surveillance of fires to air observation or in some instances completely prevents observation of the fires. Uneven terrain also reduces radar coverage and may reduce the effect of atomic weapons.
- (2) *Weather.* Weather greatly affects the capabilities of attack by air and by naval gunfire and, to a lesser degree, by artillery. It is of special importance in evaluating effects of an atomic burst. Information as to visibility at ground level and cloud cover and ceiling is the minimum requirement.

(3) *Joint effects.* Terrain and weather jointly affect visibility to the target, resulting in further determination as to whether direct fire and other observed fires can be used.

d. *Target Capabilities.* Target capability is the ability, actual or potential, of the target to influence the accomplishment of the supported unit's mission. It includes an estimate as to the time when the target can exercise that capability. An accompanying consideration is the general importance of the target. Target capability is an important consideration in determining the priority for attack to be assigned to the target. The time of attack, and the effect it is desired to impose on the target, and therefore, the selection of the means to be used are all influenced by consideration of the target's capabilities.

(1) *Basis.* Target capability is deduced primarily from the nature of the target, its location, the terrain and weather in the area of the target, and the plan of the supported unit.

(2) *Priority for attack.* There is rarely sufficient fire support available to attack simultaneously all targets that it may be desirable to engage. Accordingly, the attack of these targets is usually spread over a period of time. On occasion, owing to such factors as ammunition shortages, it may not be possible to attack all known targets. Therefore, it is often desirable to determine the relative priority of targets for attack, thereby insuring the engagement of the most important targets. Intelligence and operations representatives work together in assigning priorities. Priorities do not necessarily indicate the time of attack or the sequence with which targets will be attacked. The priority assigned a specific target will frequently depend upon the echelon at which the assignment is made and the mission of the supported unit. For example, a massed enemy force of battalion size within striking distance of the supported unit would probably be given a top priority by the direct support field artillery battalion, but from a corps artillery viewpoint might warrant a lower priority. As a guide in devising priorities for attack of targets, the following may be used:

- (a) Priority I. Targets capable of preventing the execution of our plan of action.
- (b) Priority II. Targets capable of immediate serious interference with the execution of our plan of action.
- (c) Priority III. Targets capable of ultimate serious interference with the execution of our plan of action.
- (d) Priority IV. Targets capable of limited interference with the execution of our plan of action.

[REDACTED] - **SECRET** **[REDACTED]**

e. *Enemy Countermeasures.* The capability of the enemy to interfere with or to prevent effective delivery of fire and his ability to minimize the effects of the fire must be ascertained. These factors directly influence the choice of delivery means and the assistance or protection to be provided to the delivery means. Enemy countermeasures which might be expected include counterbattery, antiaircraft fire, electronic jamming, and the attack of position areas by tactical aircraft.

207. Tentative Decision

After examining the characteristics of the target and in view of the plan of the supported unit, a tentative decision is made as to the type of effect on the target and the degree of effectiveness that it is desired to achieve. The supported unit commander or the fire support coordinator in consonance with the announced policies of the supported unit commander, makes this tentative decision. It is used as a basis for determining the appropriate available weapons to be used, the amount of ammunition to be expended, and the method and time of attack. If suitable weapons and sufficient ammunition are available, the tentative decision may be confirmed; if they are not available, the effect desired must be reconsidered and one selected that can be achieved. The capability of the target to influence the operation and the duration of time that the target is exposed to attack may force the selection of a specific type of effect, the degree of effectiveness, and the time of attack. Common types of effects that may be tentatively selected are described below.

a. *Destruction fire* physically damages the target to such an extent that it is rendered useless to the enemy. Destruction may be accomplished by penetration, blast effect, incendiary action, or by a combination thereof.

b. *Neutralization fire* causes severe losses, prevents movement or action, causes limited destruction of materiel and, in general, destroys the combat efficiency of the enemy. A satisfactory degree of neutralization sometimes can be accomplished by smoking the target or by screening a friendly force from the target. Illumination at night may assist in affecting neutralization.

c. *Harassing fire* inflicts losses, or by the threat of losses disturbs the enemy, curtails movement and, in general, lowers morale. Harassing fires are of less intensity than those intended to accomplish neutralization.

d. *Interdiction fire* disrupts the enemy lines of communication or intermittently denies their use to the enemy. Interdiction fires are usually of less intensity than those intended to accomplish neutralization.

208. Determination of Suitable Available Weapons

a. *General.* The characteristics of the available fire support means are examined initially to determine which of the means are capable of producing the desired effect upon the target and, subsequently, to determine which is most suitable to use. This determination is made by the fire support coordinator with the advice and assistance of the representatives of the fire support agencies and the artillery intelligence representative. The desires of the supported commander receive important consideration in this step.

b. *Priority of Means for Use.* Planning priority in assignment of prearranged missions to the supporting arms ordinarily should be in the order of artillery, naval gunfire, and air support. Air support ordinarily should not be assigned a mission which can be accomplished equally as well by naval gunfire or artillery, and naval gunfire should not be assigned a mission that is better suited to artillery. This principle, however, must not adversely influence the prompt delivery of available naval gunfire support, not operate to restrict the use of air support when that arm is available and capable of delivering the support required.

c. *Fire Power.* The means of fire power selected must be capable of producing the desired effect on the target and must be able to do this without causing excessive undesirable effects on the target and in the target area.

- (1) *Weapons.* The caliber, rate of fire, and refire capability of the weapon must be considered since it is possible that the desired effect may be achieved by one weapon or by more than one weapon of the same or of different types.
- (2) *Ammunition.* Targets with great resistance to destruction such as heavy tanks and reinforced concrete structures may necessitate the use of heavier weapons and more ammunition to achieve their destruction than do weaker targets such as light tanks and wooden structures. Special ammunition is often necessary. Neutralization, harassing, and interdiction of a target usually can be achieved by fires of lesser intensity than those required for destruction of that target. As a minimum, the fires should cause the enemy to react in a manner favorable to the purpose for which the fires are delivered. When firing close to friendly troops, the ammunition selected should not unduly endanger the friendly troops.
- (3) *Personnel targets.* All types of fire power are effective against personnel. A greater amount of fire power is required to obtain effective neutralization of a well disciplined enemy than a poorly disciplined enemy. Against personnel

in the open, attack by light artillery, light naval weapons, and fighter-bombers is particularly appropriate. A high angle of fall increases the effectiveness of the fragmentation pattern. Air bursts are extremely effective against personnel in the open or protected only by light cover. Projectiles and fragmentation bombs with VT fuzes are especially effective against this type of target. Atomic fire power is the greatest casualty producer but its employment will, of necessity, be limited to the most profitable targets. As the amount and strength of cover increases, attack by the lighter weapons becomes less effective, necessitating the employment of heavier fire power. The attack of personnel targets then become a matter of first destroying or neutralizing defensive works.

- (4) *Defensive works.* The heavier weapons are best suited to the destruction or neutralization of bunkers, pillboxes, dug-outs with heavy overhead cover, and other defensive works. A combination of penetration and maximum blast effect is desirable. Penetration frequently can be achieved by use of a high velocity ammunition or ammunition employing a "shaped charge." For penetration capabilities of various weapons see TM 9-1907.
- (5) *Materiel targets.* Materiel targets may be rendered ineffective by neutralization of the operating personnel or by destruction of the materiel itself. Neutralization of accompanying personnel is achieved as described in (3) above. The problems involved in destruction of materiel targets are similar to those in destruction of defensive works except that defensive works are fixed in place whereas most materiel targets are movable. Destruction of certain types of materiel such as unarmored vehicles, light tanks, and equipment may be accomplished by light and medium artillery, light naval gunfire, or fighter-bombers. Air attack using napalm is particularly effective. For destruction of heavier types of materiel, heavy or very heavy artillery, heavy naval gunfire, or air bombardment is usually required.
- (6) *Other targets.*
 - (a) The principles discussed above are applicable to the attack of other type targets such as buildings, bridges, supply installations, roads, railroads and the like.
 - (b) Atomic fire power is particularly suited to attacking a collection of targets covering a large area. Frequently in the attack of a large area, adequate coverage either is beyond

the capability of all available conventional weapons or the use of conventional fire power would result in expenditure of an excessively large quantity of ammunition.

d. Range, Trajectory, Angle of Approach, and Mobility. The means selected must be one which is capable of attacking the target within the established time. Thus the means either must be in position or have sufficient mobility to move to a position from which effective fire can be delivered within the established time. In some locations, air may constitute the only effective means of attacking a target.

e. Accuracy of the Weapon. The weapon must have sufficient accuracy to achieve the desired results without an undue expenditure of ammunition or time and without unduly harming personnel or objects whose preservation is desired. The destruction of accurately located small targets usually requires an accurate means of delivery. On the other hand, harassing fires usually can be delivered effectively by a relatively inaccurate means. A relatively accurate means must be employed when firing close to friendly troops, or enemy areas which are not to be attacked.

- (1) The ability of naval ships to deliver accurate, unobserved fire is dependent on the accuracy of determining the firing ship's location. Naval fires delivered in close support of troops require observed adjustment.
- (2) When considering observed, overhead fires in proximity to friendly troops, smaller caliber fire is placed closer to supported troops than is larger caliber fire; likewise, the relatively more accurate fire power is placed closer than is the relatively inaccurate fire power.
- (3) Air strikes may be placed as close to friendly troops as safety factors, the terrain, and the situation permit.
- (4) The foregoing considerations must necessarily receive careful evaluation in light of the tactical situation and the terrain. The availability, state of training, trajectories, and line of fire of the respective arms will also exert an influence.

f. Availability of Weapons and Ammunition. Fire power of limited availability normally is used only against suitably important and lucrative targets. The capability of the target to influence the operations of the supported unit and the general importance of the target usually are the deciding factors. Certain important targets may justify attack by all available means without regard to expenditure.

- (1) *Weapons.* Frequently the decision as to use of weapons that are of strategic or great tactical importance is reserved

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by the corps, army, or higher commander. Targets which would exploit the capabilities of these weapons should be reported immediately to the headquarters exercising control over the weapons.

(2) *Ammunition.* In the absence of other restrictions, it is usually more difficult to supply and resupply infantry crew-served weapons than artillery. Similarly, artillery usually can be supplied with ammunition more easily than naval weapons.

g. Urgency. Fleeting targets must be attacked rapidly. It will often be advisable to use a delivery means that is immediately available rather than a potentially more effective means whose attack would be too late to be of use.

h. Dependability of the Means. In planning fires, important targets must be scheduled for attack by both a primary and an alternate means. In the event the primary means is unable to deliver effective fire as scheduled, the alternate means is used. Adverse weather conditions restrict the use of certain delivery means. The all-weather capability of artillery frequently allows its use when delivery by aircraft or naval gunfire may be impossible or excessively inaccurate.

i. Vulnerability of the Means. When the possibility exists that a selected delivery means may be severely damaged or destroyed as a result of its use, consideration should be given to the employment of a less effective and less vulnerable means. For example, although air may have been determined to be the best weapon for attack of a particular target, the strong AA defense of that target may indicate the desirability of its attack by less effective means.

j. Ability To Mass Fires. Certain types of targets, such as a large group of personnel in the open, can best be attacked by a large volume of fire brought down simultaneously on the target.

- (1) Artillery is capable of furnishing this type of fire support rapidly, using time on target (TOT) technique with both observed and unobserved fires.
- (2) Naval gunfire is capable of being massed with a lesser degree of rapidity and accuracy than artillery. Preplanned fires may be massed with greater ease than adjusted fires.
- (3) Air is capable of delivering fires similar to massed fires.

k. Other Effects of the Weapon. The effects of a weapon are not always limited to those which it is desired to impose on the target. Some of these other effects may preclude the use of a particular weapon against the target under consideration. Prior to using a weapon, therefore, these other effects should be investigated and their

influence on the plan of action of the supported unit considered. Examples of other effects are listed below.

- (1) *Effects on the target.* A weapon that is too powerful or too inaccurate may destroy a target whose neutralization or interdiction is desired. For example, the plan may call for the interdiction and subsequent capture of a bridge in enemy territory. In this case, the use of an overpowerful or inaccurate weapon to interdict the bridge might result in its destruction or in such damage to it that the supported unit would be unable to exploit the bridge's capture.
- (2) *Effects on the target area.* When a target is attacked by fire, its immediate surroundings may be affected variously. The possibility, extent, and consequences of such effects should be considered in selecting the means for attack. Pitting of the terrain around the target may provide cover for defending forces initially, thereby strengthening the defense. Later the same craters may provide cover for the supported unit's assault troops. Incendiaries may burn off the area surrounding a well-concealed target and thereby reveal it more clearly to attacking forces. The debris resulting from the application of heavy fire power upon a built-up area may actually strengthen the enemy's defense of that area and often will impede the advance of friendly infantry and armored units. Lingering effects from chemical, biological, or atomic attack might deny use of an area to supported troops.
- (3) *Casualties among civilians in and around the target area.* The attack of targets by fire, particularly in built-up areas, may cause casualties among the civilian inhabitants. The production of such civilian casualties may affect both the enemy's and our own future courses of action by causing such results as health hazards, guerilla action, and sabotage.
- (4) *The morale of enemy troops.* Intensive fire on enemy installations and enemy troops has a demoralizing effect on the enemy. In considering the weapons and method of fire to employ against any target, the fire support coordinator should plan the fires to be as intense as practicable in order to achieve not only the desired effect upon the target, but also to obtain the secondary effect of reducing the enemy's will to resist.
- (5) *The morale of friendly troops.* The intensity and accuracy of supporting fires can also affect the morale of friendly troops.

- (a) Intense accurate fire on the enemy gives friendly troops confidence. Thus, if friendly troops observe large volumes of friendly fires producing some beneficial effects, they will advance more readily to the attack. Similarly, effective defensive fires give friendly troops a firmer determination to hold their ground.
- (b) The employment of an inaccurate means of delivery, however, may have the reverse effect on friendly morale. A great volume of fire is not in itself enough to raise the morale of friendly troops. If the fires do not reduce the enemy's resistance, or appear to be wasted, or endanger the supported troops, they may create an extremely undesirable effect on the morale of the friendly troops.

(6) *Other friendly fires.* The means used in the attack of a target may have undesirable effects on other friendly fires. Consideration of these effects may lead to a decision to employ means other than those best suited for attack of the target.

- (a) At times the use of air support in attacking a target precludes the employment of artillery and naval gunfire on or near the same target. In such cases, other nearby targets might escape immediate attack. Accordingly, the advantages obtained from such an air strike may be outweighed by the suppression of artillery and naval gunfire support.
- (b) Although smoke might be the most effective means of neutralizing a specific target, the possibility of drifting smoke obscuring other targets should be considered.

209. Method of Attack

Having selected the type and amount of fire power and means of delivery, the effectiveness of the fire can be further increased by the method of attack. Those factors which determine the method of attack are—

a. *Location of the Center of Impact.* For small target areas the fire is placed on the center of the area. When more than one unit is firing into a large area, several points of attack are selected to insure adequate coverage. The terrain in the target area is studied and the fire so placed as to minimize the protection afforded the enemy by natural cover. The determination of height of burst is critical for atomic attack.

b. *Surprise.* Surprise fire is extremely effective and should be continuously sought. It reduces the effectiveness of enemy protective measures and countermeasures. The principal means of obtaining sur-

prise fire is through a large amount of fire placed on an area in a short period of time, either by atomic fire or by using the time on target (TOT) techniques (FM 6-40) with conventional weapons. Thus the enemy is given little warning and in many cases is not able to take cover before many casualties are incurred. The TOT requires simultaneous arrival at the target of fire from several units; success is dependent upon accurate survey, registration, and application of meteorological corrections. If the number of units available is not sufficient for an effective TOT then the use of weapons with a high rate of fire is desirable.

c. Density of Fire. Uniform density of fire on all parts of the target area is ordinarily desirable. This is accomplished by attacking parts of the area successively by one unit or by several units simultaneously, the latter being more effective.

d. Duration of Fire. Although intense fire of short duration produces the greatest effect at the moment, it may be desirable for other reasons to fire on a target over a long period of time. This is the case with harassing and interdiction fires where the objective is to curtail movement, to disrupt or intermittently deny use of communication lines to the enemy, and to keep the enemy unnecessarily alerted with a consequent loss of morale and efficiency.

210. Time of Attack

The time of attack selected for each target should be such as to insure maximum overall effectiveness of all available fires. The target having highest priority for attack is not always attacked first, nor is it always best to attack a target as soon as possible after the target is located. Selection of the time of attack (par. 206) is influenced principally by the factors listed below.

a. Mobility of the Target. A fleeting target would ordinarily have a higher priority for attack than a static target.

b. Recuperability of the Target. The time required for the enemy's repair or replacement of the target should be considered in selecting the time to attack the target. Additionally, the period of time during which the target is most critical to the supported unit should be estimated. A comparison of these times will indicate a desirable time of attack.

c. Limitations. Although the foregoing considerations may indicate a desirable time for attack of a certain target, other factors may necessitate its attack at a less desirable time or with a less desirable means. In some cases, they may even prevent any attack by fire. Included in these factors are—

- (1) Nonavailability of suitable weapons.

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- (2) Priority for attack.
- (3) Restrictions on firing.
- (4) Weather.

211. Decision

Having determined the most suitable means, method of attack, time of attack, and the ammunition to be expended, the decision is made. The decision sets forth the type and amount of fire power to be employed, the units to fire, the grid reference and altitude of the desired center of impact, the height of burst if applicable, the time of attack, safety precautions, and method for conducting post attack analysis.

CHAPTER 12

FIRE PLANNING

212. General

a. Every artilleryman must know how to plan terrestrial fires and coordinate them with the supported unit. A thorough knowledge of this subject is necessary if maximum effect is to be obtained from the available artillery support. Fire planning is conducted by artillery headquarters of all levels.

b. Fire planning is continuous. The detail with which artillery fire plans are made depends upon the time available for planning, the extent and accuracy of target locations, the type of operation in which the supported unit or force is to be engaged, and the requirements of the fire support plan of the higher echelon.

213. General Factors

The artillery supports the attack throughout the depth and width of the hostile position by—

- a. Attacking enemy defensive areas and emplaced weapons.
- b. Destroying hostile command, observation, and communication installations.
- c. Blocking the movement of reserves.
- d. Disrupting assembled hostile armored forces.
- e. Massing its fire on targets of decisive importance at the critical moments of the attack.
- f. Delivering close supporting fires in accordance with the request of the supported units.
- g. Protecting the supported units during their reorganization on objectives.
- h. Neutralizing the enemy's artillery, mortars, and similar weapons.

214. Considerations in Fire Planning

The following factors must be considered in fire planning:

- a. The mission and plan of the supported unit.
- b. The general location, time, duration, and priority of fires desired.
- c. Information of the enemy.
- d. Artillery and ammunition available.
- e. Other fire support means available.

- f. Ground needed for artillery observation.
- g. Requirements of the fire support plan of higher headquarters.
- h. Common index for terrain.
- i. Signal for emergency lifting of fire.

215. Planning Process

a. *General.* Successful operations depend upon detailed coordinated plans. The planning process consists essentially of the following:

- (1) Accumulation of ample and accurate target information (ch. 10).
- (2) Selection of targets best suited for attack by the available artillery (ch. 11).
- (3) Estimation of the artillery and ammunition needed to obtain the desired effects on the target (ch. 11).
- (4) Preparation of a detailed artillery fire plan for the employment of artillery against the known targets and against any other targets which might be discovered.

b. *Battalion Fire Planning.* The fire planning conducted by battalions is described in detail in FM 6-101. In general—

- (1) Direct support battalions base their fire plans upon the requirements of the fire support plan and the requests of the supported unit.
- (2) The fires of field artillery battalions having a reinforcing mission are usually planned by the reinforced unit. The fires of corps artillery battalions with a mission of reinforcing a division artillery are usually planned by division artillery or direct support battalions, depending upon the manner in which the reinforcing mission is being executed.
- (3) The fires of field artillery battalions having a general support mission may be planned in detail by division artillery or may be allotted in bulk to direct support battalions.

c. *Group Artillery Fire Planning.* Artillery groups are not responsible for the preparation of fire plans unless directed to prepare fire plans by the headquarters to which attached.

d. *Division Artillery Fire Planning.* Division artillery fire planning has as its objective the coordinated field artillery fire support of the division as a whole. Depending upon the situation, it may vary from the mere checking of the direct support fire plans in a rapidly moving situation to the preparation of the complete and highly detailed plans required in the attack of a fortified position. Fire planning does not cease with the issue of a plan prior to the attack but continues throughout the operation. Seldom, however, can artillery

fire planning be divorced from the employment of other supporting weapons. All elements of the fire support plan (ch. 15) must be considered when preparing the artillery fire plan.

- (1) A division artillery fire plan is usually initiated by planning fires for the division general support artillery upon targets beyond the range of the direct support artillery, upon targets requested by the direct support artillery, and upon targets of interest to the division as a whole. Fire plans of the direct support artillery are coordinated, augmented where necessary by general support and reinforcing fires, and integrated with the fire plan for the general support artillery.
- (2) The division artillery fire plan when completed, is reproduced and disseminated. However, it continues to be modified as necessary to meet the changing situation.

e. Corps Artillery Fire Planning. Corps artillery fire planning has as its objective the coordinated field artillery fire support of the corps as a whole. Corps artillery maintains liaison and communication with each division artillery within the corps to facilitate prompt action upon requests and coordination of fires of mutual interest. In addition, liaison and communication are maintained laterally between corps artilleries and division artilleries for the same purpose. Flexibility in fire planning is facilitated by evolving both primary and alternate artillery fire plans concurrently from the beginning of the planning phase.

- (1) Preparation of the detailed corps artillery fire plan is initiated with fires being planned in the corps zone on hostile battery locations, targets beyond the range of division artillery, and targets of importance to the corps as a whole.
- (2) Artillery fires requested by lower echelons are included in the corps artillery fire plan.
- (3) The corps artillery fire plan is modified as necessary to meet changes in the situation.

f. Army Artillery Fire Planning.

- (1) The army artillery is responsible for detailed fire planning for the artillery retained under army control. Because of the range and warhead capabilities of army artillery, fires are planned on targets beyond the capabilities of corps weapons, on targets for which fire is requested by corps, and on targets of interest to the army as a whole.
- (2) Necessary coordination with corps must be accomplished if fires are planned within the corps zone of responsibility or if the corps' operations may be affected.

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(3) The army artillery fire plan is coordinated by the army artillery commander with the air support, naval gunfire, and atomic fire plans, and with the army plan of operations (par. 244).

216. Planning Procedure

The fire support plan (ch. 15) is formulated by the fire support coordinator, as directed by the supported commander. It is based on the commander's concept of operation (or tentative plan) for employment of available fire support. The fire support plan forms a basis for concurrent detailed planning and, therefore, for the preparation of the artillery fire plan. The artillery commander must consider the following in the preparation of the artillery fire plan.

- a. Organization for combat must—
 - (1) Provide adequate support for the supported unit.
 - (2) Provide massed fires where required.
 - (3) Use available weapons according to their best capabilities.
 - (4) Facilitate future operations.
- b. Instructions must delineate responsibilities for concurrent fire planning.
 - c. Zones of fires are assigned to insure adequate coverage of critical areas.
 - d. Targets critical to the operation at each level of command should be included in target summaries to insure that fires are planned for all critical targets.
 - e. Communication instructions should indicate deviations from SOI.
 - f. A common target designation system should be available to, or prescribed for use by, all fire support agencies.

217. Technique of Fire Planning

a. *Definitions.* Terms used in artillery fire planning must be understood before the technique of fire planning can be discussed.

- (1) *Fire plan.* A fire plan is the tactical plan for using the weapons of a unit so that their fire missions will be co-ordinated.
- (2) *Planned fires.* Fires (concentrations) are planned on areas and targets on which a need for fire can be envisaged. Targets or areas may include avenues of approach, possible OP's, possible weapons locations, assembly areas, and other similar installations.
- (3) *Preadranged fire.* Planned fire which is to be delivered at a specified time or for which a need for rapid delivery can be anticipated and for which firing data are prepared in advance and kept current.

- (4) *Scheduled fire.* Prearranged fire that is to be delivered at a specific time related to the maneuver or operation of the supported force. (Time specified in terms of before or after H-hour or upon accomplishment of a predetermined movement or task.)
- (5) *On-call fires.* Planned fires which are to be fired as requested. These fires may be prearranged or may be planned as to location only.
- (6) *Concentrations.* A concentration is a volume of fire placed on an area within a limited time, or an area designated and numbered for future reference as a possible target.
- (7) *Group of fires.* A group of fires consists of two or more concentrations covering a tactical locality that is too large to be covered by a single concentration. The concentrations within the group of fires may be fired either consecutively or concurrently. A group of fires may be designated by a letter or a combination of letter symbols.
- (8) *Program of fires.* A program of fires is a number of concentrations and/or groups of fires that are planned on *targets of a similar nature* and fired on schedule. An example would be the countermortar program planned by division artillery.
- (9) *Series of fires.* A series of fires is a number of concentrations and/or groups of fires that are planned to *support a maneuver phase*. An example would be the series of fires planned on an objective area just prior to the final assault. A series of fires may be indicated by a code name.
- (10) *Preparation.* A preparation is intense fire delivered before an attack to disrupt communications and disorganize the enemy's defense. Preparations are delivered in accordance with a time schedule. A preparation may include the fires of naval, ground and air means.
- (11) *Counterpreparation fire.* Counterpreparation fire is a system of intense prearranged fires delivered when the imminence of the enemy attack is discovered. It is designed to break up enemy formations; disorganize the enemy's system of command, communication, and observation; decrease the effectiveness of his artillery preparation; and impair his offensive spirit.
- (12) *Barrage.* A barrage is a prearranged barrier of fire designed to protect friendly troops and installations by impeding enemy movements across defensive lines or areas. Its normal ground use is in the establishment of prearranged final protective fires which include coordinated employment

of artillery fires, mine fields, obstacles, final protective machine gun fires, mortar concentrations, and barrages.

(13) *Schedule of fire.* A tabular or graphical presentation of scheduled fires which is fired in a definite timed sequence. The time of starting the schedule may be on call, on the occurrence of a specific event, announced later, or at a prearranged time.

b. *Artillery Fire Plans.* Artillery fire plans are prepared concurrently by operations personnel at each artillery echelon in accordance with instructions outlined in the appropriate fire support plan. In preparing the detailed fire plans the artillery operations personnel conform to the following general procedures:

- (1) Concentrations are prepared to cover all critical areas and all known and suspected targets within the zone of planning responsibility.
- (2) To the extent possible, fires are planned as requested by lower echelons.
- (3) The next higher echelon is requested to plan artillery fires on specific targets or areas beyond the capabilities of available weapons.
- (4) Groups, series, and programs of fire are prepared when required.
- (5) When time permits, artillery fire plans of lower echelons are coordinated to insure boundary coverage, eliminate unnecessary duplication, and to insure conformity with the fire support plan.
- (6) Schedules of fire are prepared.

218. Targets of Opportunity

Since targets of opportunity are normally fleeting in nature, they must be taken under fire with minimum delay. Firing on targets of opportunity involves essentially the same considerations as for prearranged fires; however, the fires are planned and targets attacked immediately as they arise.

219. Flak Suppression

Flak suppression missions may be fired by artillery upon request of appropriate tactical air commanders to reduce interference with close air support missions. These fires must be preplanned to insure engagement of all known enemy antiaircraft artillery positions within range of artillery fire. Air force flak intelligence agencies will furnish target data to appropriate artillery commanders. Requests for and coordination of flak suppression missions will be conducted through the air-ground operations system.

220. Artillery Support for Offensive Operations

The artillery fire plan for offensive operations may consist of a preparation and subsequent fires supporting the attack. The preparation is delivered during the period prior to the advance of the attacking echelons from their line of departure. All subsequent fires support the attack.

a. Preparation.

- (1) Fires planned for the preparation are usually limited to known targets and to areas that are strongly suspected of containing remunerative targets. When targets are located during a preparation, they are engaged by units who have been assigned the mission of attacking targets of opportunity.
- (2) The commander of the attacking force determines whether there is to be a preparation and its duration. He considers—
 - (a) Whether the probable effect of the preparation will justify the attendant loss of surprise.
 - (b) Available artillery and the adequacy of the ammunition supply.
 - (c) The number of remunerative targets that can be located in time to prepare and assign fires.
 - (d) Whether the effect sought can be accomplished before the enemy can change his major tactical dispositions in time to meet the attack.
- (3) Preparations may be divided into phases to permit concentration of fires successively on the various types of targets. The number, order, and length of phases are varied to fit the particular situation. Safety measures for aircraft may dictate a separate phase for attack of targets by tactical air. The following example is general in nature and does not preclude firing or scheduling fires on any type of target during any phase.
 - (a) *First phase.* Corps and army artillery, reinforced as required by elements of division artillery, execute counterbattery fires to gain superiority over the hostile artillery including long-range rocket and guided missile launching sites. Units not required for counterbattery fires interdict routes and neutralize enemy command, communication, and observation systems. Division artillery executes countermortar fires.
 - (b) *Second phase.*
 1. Corps and army artillery maintain counterbattery neutralization and initiate long-range interdiction fires. The remaining corps and army artillery fire on command and

communication centers and reinforce division artillery as required.

2. Division artillery maintains countermortar neutralization; reinforced as necessary, it neutralizes enemy command, communication, and observation facilities; neutralizes defensive areas, weapons, reserves, and assembled mechanized units; and destroys obstacles.

(c) *Third phase.*

1. Corps and army artillery continue to maintain counterbattery neutralization fires. Units not required for counterbattery fires reinforce division artillery in neutralizing enemy defensive areas and observation.
2. Division artillery delivers massed fires successively on defensive areas in the forward portion of the enemy position with priority to known defensive elements that most seriously threaten the success of the supported unit's attack.

b. *Fires Supporting the Attack.*

- (1) Fires supporting the attack are planned and are shifted in conformity with the movements of the supported unit(s). Fires are planned in the form of concentrations, groups of fires, and series of fires to be fired on a time schedule or on call.
- (2) Fires supporting the attack are planned by each echelon within its zone of responsibility to—
 - (a) Assist the advance of the supported units by attacking targets as required.
 - (b) Assist the supported units in gaining fire superiority on each successive objective so that the leading echelons can close to assaulting distance.
 - (c) Protect the supported units during periods of reorganization.
 - (d) Assist in breaking up counterattacks. When likely assembly areas and routes for counterattacks can be determined, concentrations are planned to be fired on call.
 - (e) Continue the neutralization of hostile observation.
 - (f) Continue the neutralization of hostile artillery, mortars, and automatic weapons.
 - (g) Prevent the enemy from reinforcing, supplying, or disengaging his forces.
 - (h) Disrupt command and communication systems.

221. Artillery Support for Defensive Operations

a. General. For planning purposes defensive fires are divided into four categories.

- (1) Fires delivered before the enemy forms for the attack.
- (2) Counterpreparation.
- (3) Fires during the enemy attack.
- (4) Fires in support of the counterattack.

b. *Fires Delivered Before the Enemy Forms for Attack.* Fire delivered before the enemy forms for attack include long-range interdiction and harassing fires that will force the enemy into early deployment, and fires in support of covering forces and outposts. Fires in support of the covering forces and outposts are planned either by direct support or attached battalions; long-range harassing and interdiction fires are planned by division, corps, and army artilleries.

- (1) Plans for harassing and interdiction fires are based on studies of maps, the terrain, road nets available to the enemy, and all available target intelligence.
- (2) Suitable targets for harassing fires are hostile batteries, assembly areas, observation posts, command posts, and leading enemy elements. Interdiction fires on communication centers, command posts, road junctions, bridges, and crossroads may be profitable.
- (3) Harassing and interdiction fires are prearranged to the maximum extent practicable and should be irregularly spaced.
- (4) Time of opening fire is decided by the force commander except for fires in support of covering forces or outposts. Premature firing exposes the artillery to neutralization and may reveal the plans of the defending force. Therefore, firing is usually confined to dangerous or highly remunerative targets.

c. Counterpreparation.

- (1) A counterpreparation consists of prearranged fires designed to disrupt the enemy's preparations for an attack. It involves all the field artillery with the force. It is fired only on order of the force commander. It includes fires on suspected assembly areas, enemy command and observation posts, communication centers, lines of communication, and hostile artillery positions.
- (2) The general missions for which the various echelons prepare counterpreparation fires are —
 - (a) *Corps and army artillery.* Counterbattery and reinforcing and deepening the fires of the division artillery.
 - (b) *Division artillery.* Neutralization of known or suspected routes, assembly areas and attack positions of troops form-

ing for the attack; enemy communication, observation and command; hostile forward elements; known or suspected assemblies of tanks and reserves. Division medium artillery may reinforce the corps artillery counterbattery fires.

(3) Premature firing furnishes the enemy with counterbattery data for his artillery preparation, indicates to the enemy what areas are to be avoided in forming for the attack, and expends ammunition that may not be replaceable.

d. Fires During the Enemy Attack.

(1) If the enemy is successful in launching his attack, artillery fires are delivered to break up the enemy attack formations, the assault on the main battle position, and to limit the enemy penetration.

(2) Planning of final defensive fires is centered chiefly at the direct support artillery battalions. Divisions, corps, and army artilleries plan counterbattery fires and fires to reinforce the final defensive fires of the direct support battalions.

e. Fires Supporting the Counterattack. Fires supporting the counterattack are prearranged to the greatest extent practicable and may include a preparation and fires to support the attack (par. 220). Artillery fires in support of the counterattack are delivered in close support of the counterattacking force to destroy the enemy within the penetrated area and to prevent his reinforcing the penetrated area.

222. Atomic Fire Power

a. General. Atomic fire power produces tremendous effect. The fire support coordinator, in conjunction with the general staff, advises the commander on its employment. Artillery commanders and staffs therefore must be thoroughly familiar with the characteristics of atomic fire power and with its capabilities and limitations. The general characteristics of atomic fire power are discussed in FM 100-31. Technical details and tabulated effects are covered in TM 23-200.

b. Security of Atomic Fires. Security is of utmost importance when atomic fires are to be employed, since advance warning will permit the enemy to take defense measures which will greatly reduce the effect of the atomic fire. Only those units involved in delivery of the atomic missile and friendly units affected should be informed of the impending atomic burst. Notification must be given at the latest possible time which will permit the delivery agency to accomplish its mission and affected troops to take necessary safety measures and to

adequately plan exploitation. Security of atomic attack must be stressed in the training of all combat troops.

c. *Atomic Fire Support Plan.* The atomic fire support plan is prepared in the FSCC at corps and army levels in accordance with the decision of the commander and in conjunction with planning for the employment of other fire support means. The magnitude of the destructive effect of atomic fire power, however, introduces factors in addition to those considered in planning nonatomic fires.

- (1) Integration of atomic fire power and maneuver of the force is of utmost importance. Atomic fires may be considered as additional fire power of large magnitude to complement other available fire support for maneuvering forces, or the supported commander may fit his maneuver plan to atomic fires.
- (2) Tentative targets and means of attack are selected through detailed target analysis.
- (3) Recommendations of the fire support coordinator concerning atomic attack are presented to the commander for decision. This presentation, in the form of a target analysis, is made in conjunction with the general staff (primarily G3).
- (4) Atomic fires are prepared for execution in accordance with the decision of the commander.
- (5) Safety measures required for friendly troops as determined by target analysis are enumerated.
- (6) The plan must include the following information in addition to that normally included in a nonatomic fire plan.
 - (a) Grid reference of desired ground zero.
 - (b) Type and yield of weapon.
 - (c) Time of burst.
 - (d) Height of burst.
- (7) The plan for ground delivered atomic fires must include the following instructions in addition to those normal for nonatomic fires.
 - (a) Time nuclear component of round will arrive at the firing position if not already present.
 - (b) Any restriction on registration or adjustment on the target with high explosive spotting rounds.
 - (c) Any restriction on occupation of position areas.
 - (d) Instructions for movement after firing.
 - (e) Instructions for reporting when round is fired.
 - (f) Instructions or requests for post attack analysis.

CHAPTER 13

FIELD ARTILLERY FIRE DIRECTION

223. General

a. This chapter covers the principles, procedures, and organization required for field artillery fire direction at the field artillery group, division, and corps artillery echelons. Currently, corps is the highest echelon that actively directs field artillery fires. For information on fire direction at battery and battalion levels, see FM 6-40 and FM 6-101.

b. Field artillery fire direction is that process necessary for the control, coordination, and effective delivery of artillery fires available to the command.

224. Responsibilities

a. The artillery commander is responsible for artillery fires. Division and corps artillery commanders command all artillery units assigned and attached to their command and not further attached to other organizations. The corps artillery commander does not command artillery units assigned or attached to divisions. He does, however, in the name of and as prescribed by the corps commander, exercise a degree of control over them. In exceptional circumstances and when specifically authorized by the corps commander, he may direct division artilleries to fire on targets of importance to the corps as a whole.

b. The artillery commander establishes and operates a fire direction center (FDC) to assist him in fulfilling his responsibilities for the direction of artillery fires. These responsibilities include—

- (1) Continuous and accurate artillery fire support under all conditions of weather, visibility, and terrain.
- (2) Rapid delivery of artillery fire within the zone or sector of the supported unit or force.
- (3) Flexibility of artillery fires sufficient to engage all types of targets and the ability to shift fires rapidly from one area to another.
- (4) Massing of artillery fires when needed.
- (5) Control of artillery fires through orders, policies, and priorities and by means of adequate liaison and communication.

- (6) Implementation of established safety measures.
- (7) Target intelligence.

225. The Fire Direction Center

a. *Definition.* The artillery fire direction center is the element of the artillery headquarters that consists of operations, intelligence, and communication personnel and equipment by means of which the artillery commander directs artillery fires. At echelons above battalion, the emphasis in fire direction shifts from the detailed application of gunnery techniques to fire planning. Details concerning the operations of FDC's at battalion and lower echelons are contained in FM 6-40.

b. *Location.*

- (1) The primary requirement for the location of the FDC is that it be able to control the fires of its subordinate units.
- (2) When the individual requirements of the FSAC (ch. 15) and the artillery FDC *do not* conflict, insofar as locations are concerned, they may be located together or in the same general vicinity. When these requirements *do* conflict, the FSAC and FDC should be separated.
 - (a) The relative location of these two agencies does not alter their functions.
 - (b) Consideration must be given at all echelons to proper dispersion and the unnecessary enlargement of the command post.

c. *Organization.* The organization of FDC's at different levels is varied to meet requirements and conditions peculiar to each echelon.

- (1) *Group FDC.* The field artillery group ordinarily is attached to another artillery headquarters. Hence, group FDC usually is not directly concerned with coordination with the supported unit nor with target intelligence to the same degree as are other echelons. When operating as the artillery headquarters for a task force or similar organization, group FDC functions like that of a division artillery. Group FDC is under the direction of the group S3 and includes necessary personnel from the S2, S3, and communication sections.
- (2) *Division artillery FDC.* Division artillery must coordinate its fires closely with the supported unit and is vitally concerned with target intelligence. In addition, it coordinates the division countermortar activities. The division artillery FDC normally operates under the supervision of the S3 and includes personnel from the S2, S3, and communication sections.

(3) *Corps artillery FDC.* The corps artillery FDC operates in much the same manner as the FDC of division artillery. It coordinates counterbattery activities. The corps artillery FDC operates under the direct supervision of the corps artillery executive officer and includes necessary personnel from the S2, S3, and communication sections.

(4) *Army artillery FDC.* The organization of the army artillery FDC is prescribed by the army artillery commander. Whether or not he organizes an FDC depends upon the amount of artillery retained under army control. The retention of artillery requires that the army artillery commander exercise some degree of fire control over the units so retained.

d. *Duties of Personnel.* For duties of the S2 and S3, see paragraphs 27 and 28, respectively. Duties usually assigned to other members of the FDC are discussed below.

(1) *Counterbattery intelligence officer (S2 section, corps artillery only) (ch. 16).*

- (a) Keeps all available information of hostile artillery.
- (b) Classifies new enemy battery locations.
- (c) Prepares and distributes hostile battery lists.
- (d) Assists S2 as directed.

(2) *Countermortar intelligence officer (S2, section division artillery only) (ch. 16).* This officer's duties are similar to those of the counterbattery intelligence officer, but are related to enemy mortar activities. In addition he has certain duties pertaining to countermortar radar. These duties include—

- (a) Advising the commander and staff on all radar matters.
- (b) Advising and aiding the S3 in organizing and supervising radar training programs.
- (c) Supervising radar maintenance, submitting necessary reports, and maintaining required records thereon.
- (d) Providing liaison with higher headquarters on radar matters.
- (e) Maintenance of clutter and coverage diagrams.

(3) *Photo interpreter (S2 section).*

- (a) Locates enemy targets by study of aerial photographs.
- (b) Disseminates information on targets located.
- (c) Assists S2 as directed.

e. *Communication (ch. 17).*

(1) The FDC is the center of field artillery tactical communication nets. Wire trunks and simplex or direct circuits provide telephone communication to higher, lower, and adjacent FDC's. Command and fire direction radio nets parallel the

wire nets to supplement them or replace them entirely in the event of wire failure and in rapidly moving situations. Instructions regarding the installation and operation of communication systems are published in SOI's, SSI's, SOP's, and orders.

(2) Type communication nets available at FDC of group, division, and corps are shown in figures 26, 28, 29, 30, 32 and 33. The communication system of army FDC is prescribed by the army artillery commander.

f. *Forms, Records, Reports, and Charts.*

(1) *S3 section.*

(a) *Planning chart.* A planning chart is maintained for the purpose of exercising tactical control of artillery fire. This chart (a map or map substitute) is used along with a concentration and target overlay, a fire capabilities overlay (fig. 11), and copies of fire plans (artillery, air, and naval gunfire).

(b) *Operations chart.* An operations chart is maintained. Accompanying overlays depicting the friendly and enemy situation, the fire capabilities of the unit or units concerned, along with the fire plans (artillery, air, and naval gunfire) are used in conjunction with this chart.

(c) *S3 journal.* This is a section journal in which are recorded all incidents, messages, and orders affecting the section, with an entry describing the action taken, if any. Copies of messages and orders sent and received and the record of fire missions are attached to and become a part of the S3 journal. At specific intervals the journal is closed and made a part of the unit journal.

(d) *Record of fire missions.* This is a locally reproduced record showing each fire mission handled by the FDC. It includes for each target the concentration number, source, description, location, unit(s) firing, time fired, type and amount of ammunition fired, estimated effect, and such other information as may be appropriate (fig. 12).

(e) *Periodic operations report.* This is a report summarizing unit activities submitted daily or as prescribed by the commander. The form is normally prescribed by the commander. Any item noted in the periodic operations report will also be noted in the S3 journal. Therefore, the periodic operations report is a summary of the S3 journal.

(f) *Command report.* This is a periodic narrative summary of events from the point of view of the commander. It is

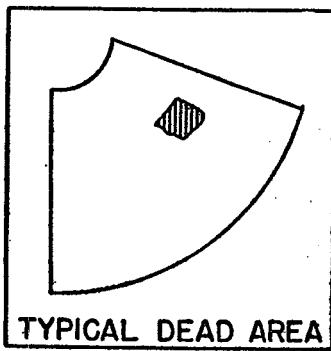
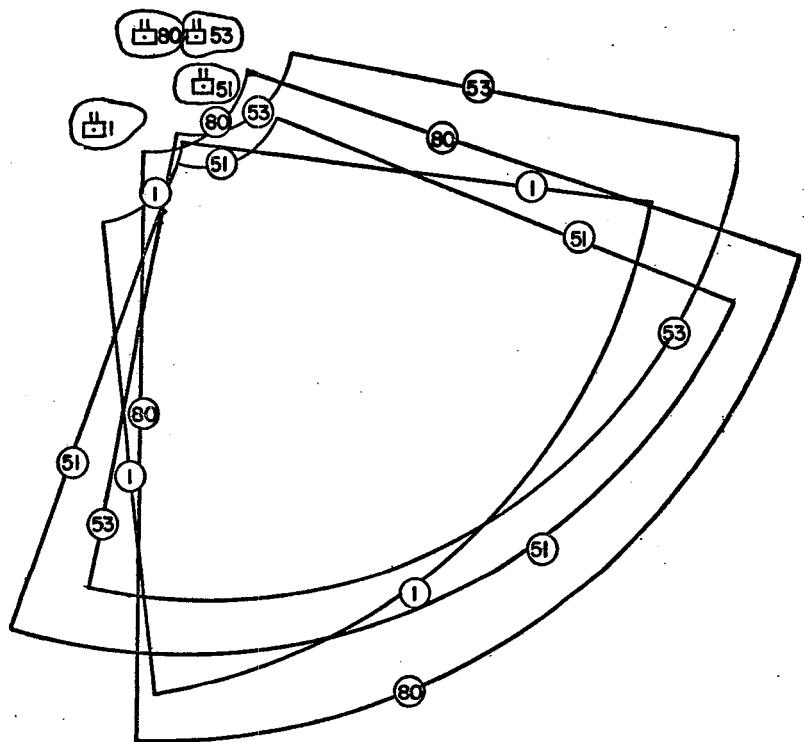


Figure 11. Fire capabilities overlay.

RECORD OF MISSIONS

FDG: I CORPS ARTY
FROM: 010001 APRIL 1952
TO: 012400 APRIL 1952

CONC. NUMBER	SOURCE	DESCRIPTION	LOCATION	ASSIGNED TO	TIME FIRED FROM TO	AMMUNITION Type	AMMUNITION Amount	EFFECT
E106	AOP	ESTIMATED CO DIGGING IN HILL 506	567829	19th FA Bn	1115H	113 OH	HE WP 18 6	20 CASUALTIES ENEMY DISPERSED

Figure 12. A type record of missions.

the medium through which the commander may record, review, and evaluate the overall activities of his command. The report is prepared under the supervision of the S3, but must be signed by the organization commander (SR 525-45-1).

(2) *S2 section.* For a discussion of the records, reports, and charts maintained by the S2 section, see chapter 16.

g. Operations. The FDC operates in accordance with the principles, procedures, and requirements discussed above and with the orders and policies of the artillery commander. The detailed operations of the S2 section relative to target intelligence and the processing of target information are discussed in chapters 10 and 16. The procedures involved in attacking targets and in handling fire missions are discussed in FM 6-40. The general procedures pertaining to the assignment of fire missions and for prearranged fire planning are outlined below.

(1) *Assignment of fire missions.*

(a) *Group.* Group FDC assigns fire missions direct to its attached battalions. When missions are assigned from corps or division artillery FDC direct to battalions of the group, group FDC monitors and records them.

(b) *Division artillery.* Division artillery FDC normally calls on division general support battalions and on corps reinforcing battalions for fire missions. If the importance of the mission warrants it, direct support battalions may be directed to fire; however, they are not normally taken away from their mission of direct support. If additional artillery fire is desired, the FDC contacts corps artillery FDC direct. Requests for air or naval support received at the FDC are referred to the division FSCC, if they cannot be handled equally well or better by field artillery.

(c) *Corps artillery.* Corps artillery FDC may assign fire missions to corps groups or battalions that have tactical missions of general support or reinforcing. In calling for fire on targets of opportunity from a corps artillery group, corps artillery FDC may contact the appropriate battalions within the group directly. Corps may call upon division artilleries to participate in important missions. In doing so, the term "all available artillery" is employed, meaning that division FDC excludes the fires of battalions engaged in more important close support missions. Requests for additional artillery fire go direct from corps artillery FDC

to army artillery. Air or naval support requests received at corps artillery FDC are referred to corps FSAC.

- (d) *Army artillery.* The procedures used by the army artillery in the assignment of fire missions are prescribed by the army artillery commander.
- (2) *Detailed steps in fire planning.* For a discussion of fire planning principles and procedures see chapter 12.
- (a) Intelligence personnel compile a list of all known targets utilizing all possible sources (ch. 10). Studies are made of maps, photos, and enemy dispositions to obtain a list of suspected targets. This information is provided to operations personnel.
- (b) Operations personnel, with the assistance of intelligence personnel, study all targets to determine the best method of attack (ch. 11). In addition, special requirements for artillery fire from the supported unit are obtained.
- (c) Operations personnel then determine the capabilities of each general support or reinforcing battalion in terms of the targets ((b) above) it can attack. The fires of the battalions capable of attacking the fewest number of those targets selected are planned first; their fires are planned, to the extent of their capabilities, on the targets that they can attack. The elimination process is continued until all of the selected targets are covered.
- (d) Requests for additional fire are received from subordinate units and included in the planning.
- (e) Fire plans submitted by subordinate units are coordinated and supplemented by fires from general support or reinforcing artillery. Additional artillery fires needed are requested from the next higher artillery commander.
- (f) Throughout the preparation of the artillery fire plan, coordination with the supported unit, other supporting agencies, and with lower and higher artillery echelons is required.

CHAPTER 14

ANTIAIRCRAFT OPERATIONS CENTER AND ANTIAIRCRAFT ARTILLERY INFORMATION SERVICE

Section I. INTRODUCTION

226. General

The principles of organization, operation, and functions of the antiaircraft operations center (AAOC) and the antiaircraft artillery information service (AAAIS) as set forth in this chapter are to be used as a guide for their establishment. Each antiaircraft defense will present a different problem which must be solved by the application of these principles, modifying them as necessary to arrive at a sound solution.

227. AAOC—AAAIS Relationship

The AAOC and AAAIS will be discussed separately, but in practice each is closely related to and supplements the other. The relationship between these and other agencies is indicated in figure 13.

Section II. ANTIAIRCRAFT OPERATIONS CENTER (AAOC)

228. General

a. The antiaircraft operations center is the tactical or battle headquarters of the antiaircraft defense commander (par. 22). It is in this center that all of the information available to the antiaircraft defense is collected, evaluated and disseminated as intelligence. It is in this center and through this agency that the antiaircraft defense commander exercises operational control of all elements of the antiaircraft artillery defense.

b. An antiaircraft operations center is organized and operated in each area defended by antiaircraft artillery by the senior (or designated) antiaircraft artillery headquarters in the defense. When an AAA brigade or group headquarters is present, an antiaircraft artillery operations detachment normally will be provided to operate the AAOC. When an antiaircraft artillery operations detachment is not

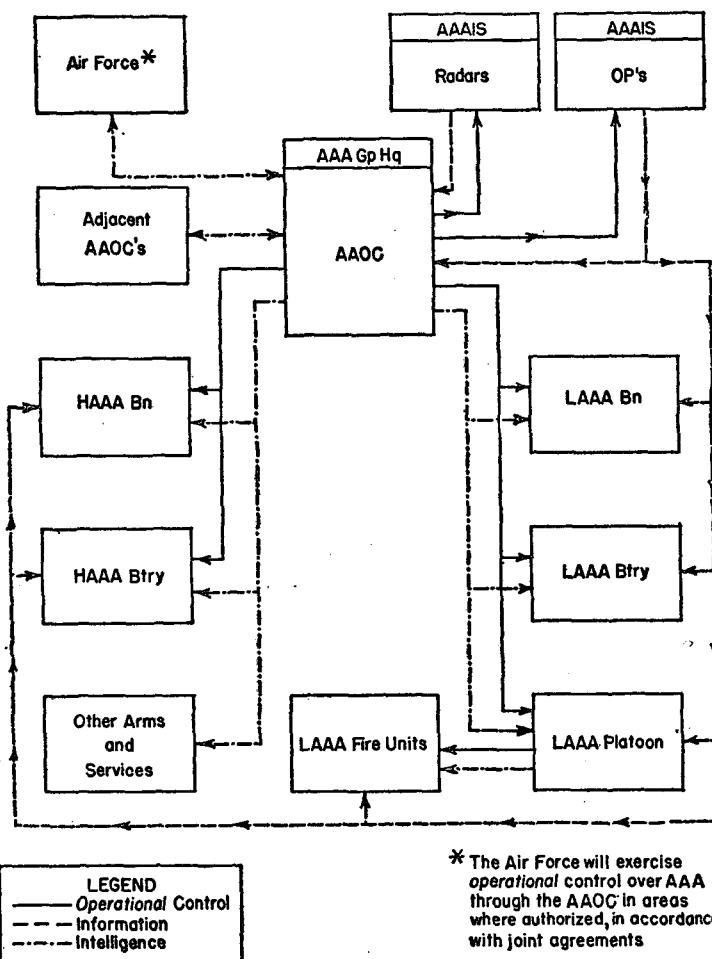


Figure 13. AAOC—AAIS relationship (AAA group level).

provided, the principles and procedures are the same, but the equipment must be partially improvised and the operating personnel drawn from the units of the defense.

c. Centralized control for each AA defended area is obtained by establishing the AAOC at the highest AA echelon in the area. If communications facilities are inadequate due to the distance between units or the number of units within the defense, or for any other reason, operational control should be exercised through one or more subordinate AAOC's.

d. For details of the operations of an AAOC, see FM 44-8.

229. Functions

a. The AAOC coordinates all of the available antiaircraft artillery so as to engage an enemy with maximum effectiveness. To accomplish this, the AAOC has two primary functions.

- (1) The collection, evaluation, and dissemination of information and intelligence.
- (2) The exercise of operational control, including fire direction, when and as necessary.

b. The secondary functions of the AAOC are—

- (1) To act as a center for liaison and coordination with other agencies.
- (2) To provide higher, lower, and adjacent headquarters with pertinent information.
- (3) To provide warning of the approach of hostile aircraft to other arms and services.
- (4) To provide the AA defense commander with information on the effectiveness of the defense.
- (5) To perform certain routine functions, such as the collection and dissemination of meteorological data, the preparation and maintenance of necessary statistics and records, and the submission of reports.

230. Command

The AAOC is under the command of the AA defense commander. He is responsible for its organization and operation. He normally delegates the duty of organizing the AAOC and supervising its operation to his executive officer.

231. Information AAOC's

In a defense composed of more than one battalion, each subordinate group or battalion may establish information AAOC's to keep the unit commanders and staffs informed of the situation. One or more of these information AAOC's may be designated as an alternate, but they have no operational control of their fire units as long as the senior or alternate AAOC's remain in operation.

232. Alternate AAOC's

The AA defense commander will designate one or more of the AAOC's of the defense as an alternate. Alternate AAOC's will be prepared to assume the functions of the senior AAOC in the event the senior AAOC goes out of action.

233. Subordinate AAOC's

When the area of responsibility of the AA defense commander is such that the senior AAOC cannot directly control all of the elements of the defense, subordinate AAOC's will be established. Normally, such a situation will be dependent upon the capabilities of the communication facilities of the defense. These AAOC's will assume operational control of the designated fire units under the direction and supervision of the senior AAOC of the area.

234. Location of the AAOC

- a. The AAOC must be located where it can best exercise operational control over the fire units of the defense. However, it is also desirable to locate the AAOC where coordination with air force control or intelligence agencies will be facilitated.
- b. Unless adequate protection exists for the AAOC and communication facilities, the AAOC normally should not be located within the vulnerable area.

Section III. ANTI AIRCRAFT ARTILLERY INFORMATION SERVICE (AA AIS)

235. General

a. The antiaircraft artillery information service is organized primarily to provide elements of the antiaircraft defense with local warning of the approach of hostile aircraft. It is organized, equipped, and trained to obtain accurate information of aerial activity with which to warn the defense fire units of enemy attack or the approach of friendly aircraft. It also serves to warn the defenses of any other enemy activity in the area. It provides the defenses with timely information which will enable them to engage the enemy most effectively.

b. A well established AAAIS provides for the contribution of information by all elements of the defense so that rapid distribution of pertinent intelligence to the units concerned may be made by the AAOC. The AAAIS supplements the long-range warning received from the Air Force.

c. A well established AAAIS permits the most economical employment of personnel and equipment. This will not only result in a saving of materiel by the defense but will also permit the weapons of the defense to be maintained with the highest order of efficiency. In a defense reasonably assured of adequate warning, it will not be necessary to have complete manning personnel always at their equipment.

236. Command and Control

The antiaircraft defense commander is responsible for the establishment and operation of the antiaircraft artillery information service. He coordinates and controls all AAAIS facilities. Normally he delegates the duty of coordinating the AAAIS facilities to his S2. The S2 in turn will require the assistance of the communication officer and radar officer.

237. AAAIS Facilities

The AAAIS embraces all available sources of information within the defense. There are two principal sources of information organic to the AAA. These are—

a. Radar. T/O & E's authorize radars to AAA units for surveillance purposes. When necessary, the surveillance radars may be supplemented by the use of gun-laying radars or target-acquisition radars. Such radars generally lack the range and pickup characteristics desirable for warning purposes; however, they are suitable for AAAIS to a limited degree.

b. AAAIS OP's. Ground AAA observation posts are established for the primary purpose of giving flash warning of low-flying aircraft to the AA defense permitting the light AAA crews to locate and track the approaching target in sufficient time to open fire at effective ranges. Other units in the defense receive this warning primarily for local defense of their positions. The secondary purpose of these observation posts is to give warning of any hostile surface activity that might affect the defense.

CHAPTER 15

FIRE SUPPORT COORDINATION

Section I. GENERAL

238. General

a. Fire support is the most flexible and one of the principal resources available to the commander for influencing the outcome of battle. The effectiveness with which he employs this resource in support of his plan of action may be decisive. Fire support coordination is not a new procedure or technique; its basic principles have existed for many years. Today its importance is emphasized by the increased lethality and availability of a variety of fire support means by which battle can be influenced.

b. This chapter establishes principles and responsibilities, and outlines organization and techniques for planning, coordinating, and integrating the fires of all weapons of the Army, Navy, and Air Force employed in support of ground combat operations.

c. The principles, organization, and techniques outlined in this chapter are designed to insure maximum effectiveness in the use of fire support by providing for coordination of available fire support means among themselves and for coordination of all fire support with the plan of operations. This coordination is effected without adversely affecting any of the present methods used in the rapid delivery of fires essential to the support of operations (par. 252).

239. Principles of Fire Support Coordination

a. The supported or force commander, through combat orders, policies, priorities, or individual decisions employs all fire support available to his command.

b. A fire support coordination center (FSCC) is established at each combat echelon when the responsibilities and functions of the echelon dictate (par. 244).

c. The fire support coordinator is the senior artillery officer at each echelon where an FSCC is established.

d. The organization and procedure for the coordination of fire support provides for the following:

- (1) Adequate control and supervision by the force or supported commander.

~~Security Information~~

- (2) Concentration of fire support means upon any target or targets.
- (3) Distribution of effective fire upon several targets simultaneously.
- (4) Prompt attack upon targets of opportunity.
- (5) Deviation from the fire support plan when necessary to meet unforeseen or changing situations.

e. Primary consideration is given to furnishing the type of fire support requested.

f. Fire missions are assigned to or requested of the agency that can deliver most effectively the required fire within the required time. When considerations, such as ammunition, tactical security, and co-ordination permit, the most economical means for delivery of fire is used.

g. Coordination must be effected rapidly and decisively in the attack of targets of opportunity. Fires on such targets usually are delivered by the most readily available effective means.

h. Fire support missions are undertaken by the lowest echelon which has the necessary means available. When appropriate means are not available, assistance is requested from higher echelons.

i. Fire support is coordinated at each echelon to the degree to which it is involved in the mission. Final action is accomplished at the lowest echelon which can effect complete coordination of the fire support mission.

j. The necessary precautions to safeguard friendly troops, aircraft, vessels, and installations from friendly fires are implemented at each echelon where fire support is coordinated.

k. A common system of target designation must be employed by all participating fire support agencies.

240. Responsibilities

a. *The Supported or Force Commander.* Coordination of fire support is a command responsibility. The supported or force commander is responsible for the coordination of all available supporting fires—with each other and with the operations of his command.

b. *The Fire Support Coordinator.* The fire support coordinator (the senior artillery officer) establishes and supervises the operation of the FSAC. He is responsible for the details of coordination of fire support, based on the commander's decision, combat orders, policies, and priorities.

c. *The ACofS G3 (S3).* The ACofS G3 (S3) of the force or supported unit, has general (unit) staff responsibility for coordination of fire support.

241. Relationships

The following relationships, concerning fire support coordination, which exist between the supported or force commander, staffs, and the fire support coordinator are emphasized:

a. *The Supported or Force Commander.* The commander makes basic decisions concerning fire support, maneuver, defense, and the coordination between them. He bases these decisions on his estimate of the situation, aided by the estimates and recommendations of his staff, the fire support coordinator, and representatives of fire support agencies.

b. *The Fire Support Coordinator.* The fire support coordinator makes recommendations, and, based on the commander's decision, coordinates the various fire plans with the G3 (S3). He coordinates the application of fire support within the policies determined by the supported or force commander.

- (1) When artillery is assigned or attached to the supported unit or force, the artillery officer is both a commander and a special staff officer (par. 16). As fire support coordinator, his relationship with the commander is that of a special staff officer.
- (2) When artillery is in direct support (par. 59), the artillery commander cannot be a special staff officer of the supported unit because he is under the command of the next superior artillery commander. However, his relationship with the supported commander includes that of advisor on fire support matters and, therefore, he discharges the functions of fire support coordination in a manner similar to a special staff officer. The obligation to discharge the functions attendant to fire support coordination, in accordance with the requirements of the supported commander, is implicit in the assignment of a direct support mission. The same relationship holds for the artillery liaison officer, as the direct support artillery commander's representative, at infantry or armored battalion level.

c. *The ACofS G3 (S3).* The G3 (S3) exercises general (unit) staff supervision over the coordination of the plans of fire with the plan of maneuver or scheme of defense. He assists his commander in preparing combat orders, policies, and priorities on which fire support plans are based. When the fire support plan to the operation order is prepared, he verifies the coordination of the various fire plans with the plan of maneuver or scheme of defense, and, when approved by the commander, includes the fire support plan in the operation order as an annex. During the execution of the operation, he continues to exercise normal staff supervision.

Section II. THE FIRE SUPPORT COORDINATION CENTER

242. Definition

A fire support coordination center (FSCC) is an operating agency of the supported or force commander in which the representatives of the supported unit or force and the fire support agencies work together to plan and coordinate fire support. This agency provides for effective utilization of the fire support means, including the timely attack of targets and the shifting of fires in accordance with the plans and needs of the supported unit or force.

243. Functions

The functions listed below are performed within or under the supervision of the FSCC by the various personnel operating therein. The FSCC—

- a. Continually makes plans and allocates, coordinates, and integrates the several fire support means in accordance with the directives, policies, and priorities of the supported or force commander so as to most effectively support the plan of operations of the force or supported unit.
- b. Functions as the commander's focal point for target intelligence and target analysis.
- c. Evaluates and coordinates the requests received for additional supporting fires.
- d. Prepares and coordinates requirements for fire support. It coordinates and initiates requests for and directs additional supporting fires when required.
- e. Keeps the commander and staff informed of the capabilities of and the actual support rendered by the fire support agencies.
- f. Advises the commander and staff as to the most efficient and effective employment of the available fire support.
- g. Prepares the fire support plan for the commander, based on his policies, plans and priorities, and coordinates the separate fire plans in accordance with the plan of maneuver or scheme of defense.
- h. When appropriate, recommends and implements approved policies concerning safety measures to protect friendly troops, aircraft, vessels, and installations from friendly fires.

244. Establishment

Fire support coordination functions exist and are accomplished at all combat echelons. Fire support coordination centers are established at these levels when and with the degree of organization that the functions and responsibilities of the level dictate. At field army, coordi-

nation of air support with the plan of operations is normally accomplished at the JOC since tactical air is the field army commander's principal means of fire support that can be maneuvered across the entire field army front. However, when long-range weapons are retained under army control, the employment of these weapons is coordinated with the plan of operations by the army artillery commander (par. 225) in accordance with the army commander's desires and JOC is notified of the impending action.

245. Location of FSCL

a. The decision as to the location of the FSCL is a function of the supported or force commander who considers the recommendations of members of his staff and the fire support coordinator in arriving at his decision.

b. At all echelons where an FSCL is established, it is desirable that it be located *within* or *immediately adjacent to* the command post of the command for which fire support is provided. Ideally it is in the immediate vicinity of G2-G3 operations room or similar establishment. In order to accomplish this close integration of command installations, the following are important considerations:

- (1) The location of the command post must be carefully chosen in order that reliable communication can be established between the FSCL and the fire support agencies.
- (2) The FSCL must be kept to the minimum size consistent with the performance of its mission.

246. Composition of FSCL

a. Battalion (Infantry or Armored). The FSCL consists of the fire support coordinator (artillery liaison officer), representatives of the infantry or armored battalion, representatives of other fire support agencies, and such operations and communication personnel as necessary.

b. Regimental or Combat Command. The FSCL consists of the fire support coordinator (direct support artillery commander) and his representatives, representatives of other fire support agencies, representatives of the supported unit, and such operations and communication personnel as necessary.

c. Division. The FSCL consists of the fire support coordinator (division artillery commander) and his representatives, representatives of other fire support agencies, a G2 representative (acting as G2 Air), the G3 Air, and such operations and communication personnel as necessary.

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d. Corps. The FSCC consists of the fire support coordinator (corps artillery commander) and his representatives, representatives of other fire support agencies, the G2 Air, the G3 Air, and such operations and communication personnel as necessary.

e. Army. When the field army commander retains such weapons as guided missiles, free rockets, or long range cannon under his control, the army artillery commander coordinates their employment (par. 244).

247. Communication

a. It is essential that excellent communication, using existing communication facilities where possible, exist between the FSCC and—

- (1) The FSCC's at higher and lower echelons.
- (2) The force or supported unit.
- (3) The artillery (FDC).
- (4) Other fire support agencies.

b. Communication between FSCC's and from the FSCC to the supported unit or force is a command responsibility.

c. The fire support coordinator supervises the establishment of communication and the internal arrangement of communication equipment within the FSCC.

d. Each fire support agency and each staff section represented in the FSCC is furnished the necessary means of communication and operating personnel by its parent unit.

248. Organization

a. The FSCC is organized to facilitate coordination between the supported unit or force and representatives of fire support agencies. The organization of this agency is dependent upon the echelon, type of operation, and the fire support means available. It provides representatives of fire support agencies with information and intelligence on which to base their recommendations, plans, and actions.

b. The principal personnel normally represented in the FSCC are listed below.

- (1) Fire support coordinator of the echelon concerned.
- (2) Operations and intelligence representatives of the artillery echelon concerned.
- (3) G3 Air (S3 Air) of the echelon or supported unit staff.
- (4) G2 Air at corps, and G2 representative at division who acts as G2 Air.
- (5) Air liaison officer (Air Force officer) at division and corps. (Forward air controller at lower echelons.)

- (6) Naval gunfire officer (Army officer) and assistant (Navy officer) at corps and division. (Naval gunfire liaison officer (Navy officer) at regiment and battalion.)
- (7) Other representatives as required, such as those furnished by the counterfire information center, heavy mortar units, or AAA units.

249. Duties of Personnel

The duties of personnel who may be members of a *division* FSCC are listed below. Generally, the same duties are performed at higher and lower echelons by appropriate members of those FSCC's.

a. The Division Fire Support Coordinator—

- (1) Functions as the principal advisor to the division commander and staff on all fire support matters. He supervises the planning, allocation, coordination, and integration of all supporting fires and the preparation of the fire support plan.
- (2) Establishes the FSCC and supervises and coordinates the activities of FSCC personnel.

b. The Division Artillery Operations Representative—

- (1) Functions as the principal assistant to the fire support coordinator and represents him in his absence.
- (2) Acts as coordinating agent for artillery.
- (3) Assists in the preparation of the fire support plan and the integration of the artillery fire plan into the fire support plan.
- (4) Keeps the members of the FSCC informed of—
 - (a) The fire capabilities of the artillery.
 - (b) The artillery fire support actually rendered.
- (5) Assists the coordinator in the determination of the recommended priority of targets to be attacked.
- (6) Maintains the situation map and necessary operational records of the FSCC.
- (7) Assists in supervising the operations, interior management, and internal organization of the FSCC.

c. The Division Artillery Intelligence Representative—

- (1) Performs FSCC functions pertaining to target intelligence, keeping members of the FSCC informed of the current status of appropriate targets confronting the division, including an analysis of their characteristics, an estimate of the most effective means of attacking them, and an estimate of damage to targets that have been attacked.
- (2) Coordinates the exchange of pertinent survey information between the various fire support agencies.

(3) Disseminates intelligence and information received in the FSCC (par. 205).

(4) Maintains appropriate target intelligence records, files, maps, and overlays in the FSCC.

d. *The Division G3 Air—*

(1) Represents the division G3 in the FSCC.

(2) Keeps members of the FSCC informed of the tactical situation, the plan of action of the division, and of any contemplated changes in the plan.

(3) Keeps the G3 informed of the situation pertaining to fire support.

(4) Maintains close contact with G3 Air and S3 Air officers at higher and lower echelons on matters pertaining to tactical air support.

(5) Coordinates requests received from subordinate units for air support.

(6) Prepares the division daily requirement for preplanned air support in coordination with other members of the FSCC, indicating the priority of each requirement, and, after approval, forwards the statement of requirements to the corps G3 Air.

(7) Prepares the air support plan for operations of the division.

(8) Forwards requests for immediate air support direct to JOC.

(9) Coordinates air missions with other supporting fires; e. g., arranges with other members of the FSCC for flak suppression fires, target marking by artillery or naval gunfire, and suppression of friendly fires as necessary.

(10) When air alert aircraft are allotted to the division, the G3 Air officer, in coordination with the air liaison officer (ALO), makes recommendations to the fire support coordinator for the use of this air effort in accordance with the overall division situation and requirements, in order that rapid action may be taken on targets of opportunity, or to meet unexpected threats, or for other immediate emergencies.

(11) Maintains appropriate records pertaining to air support of the division.

(12) Coordinates recommended bomb line changes submitted by subordinate units and submits them to corps FSCC, or, in emergencies, direct to JOC.

e. *The Division G2 Representative (Acting G2 Air)—*

(1) Represents the division G2 in the FSCC.

- (2) Keeps members of the FSCC informed of the enemy situation and capabilities and of weather and terrain affecting operations.
- (3) Prepares preplanned requests for tactical air reconnaissance for submission to corps G2 Air.
- (4) Coordinates requests for immediate tactical air reconnaissance missions and forwards these requests direct to JOC.
- (5) When applicable, prepares aerial reconnaissance portion of paragraph 3, Intelligence Annex (Plan).
- (6) Keeps the spot report receiver board current (when applicable).
- (7) Maintains appropriate records pertaining to aerial reconnaissance missions requested by and executed for the division.
- (8) Continually coordinates with G2 Air officers at higher echelons on matters pertaining to aerial reconnaissance and aerial photographs.
- (9) Recommends to G2, after coordination with members of the FSCC, the distribution of aerial photographs.
- (10) Coordinates with the division artillery intelligence representative on target intelligence requirements for photo interpretation.

f. *The Division Air Liaison Officer (ALO)*—

- (1) Advises the division commander and staff, including the fire support coordinator, on matters pertaining to air operations.
- (2) Provides technical assistance in formulating requirements for air missions, including assistance to the G3 Air in preparing the air support plan.
- (3) Keeps the FSCC informed of air support missions in the division area.
- (4) Monitors the coordination of ground fire and friendly air operations.
- (5) Receives information from reconnaissance or other tactical aircraft for transmission to interested ground force elements.
- (6) Obtains tactical air control parties required by the division.
- (7) Supervises the activities and assignment of the tactical air control parties allocated to the division.
- (8) Allots flights, in accordance with the requests of the G3 Air, to tactical air control parties for further direction onto targets during periods when aircraft have been allotted to the division and at such other times as authorized.
- (9) Maintains liaison with the air liaison officer at corps.

g. The Division Naval Gunfire Officer (NGFO, Army Officer)—

- (1) Advises the division commander and staff, including the fire support coordinator, on matters pertaining to naval gunfire support.
- (2) Prepares the naval gunfire requirements and plan and assists in the coordination and integration of the naval gunfire plan with other fire plans and with the plan of operation.
- (3) Assists, when necessary, in transmission of firing data between the observer and the supporting ship(s).
- (4) Insures that the supporting ship(s) are informed of the situation ashore.
- (5) Disseminates to interested agencies, intelligence obtained from naval gunfire sources.
- (6) Coordinates and processes requests from subordinate units for additional naval gunfire support.

h. The Assistant Naval Gunfire Officer (Navy Officer). Assists the naval gunfire officer with advice on the techniques and capabilities of naval gunfire, ammunition supply, and communication.

Section III. PROCEDURE

250. General

a. Commander's Concept of Operation. The commander's concept of operation is an expression of his tentative plan of operation. This concept, by outlining the contemplated employment of both the maneuver and the fire support elements available to the command, furnishes guidance to these elements in their planning for, and conduct of, the operation.

- (1) The commander may announce his concept of operation either orally or in written form. When written, the concept may be contained in paragraph 2b of the operation order (apps. II and III). If the concept is lengthy, it may be issued as a separate annex to the operation order.
- (2) The fire support portion of the commander's concept of operation is the basis for the fire support plan (*c* below).

b. Operation Order. The bulk of the information and instructions pertaining to fire support is contained in the fire support plan annex to the operation order. However, the operation order does contain sufficient information and instructions concerning the fire support agencies to give the supported units an indication of the fire support available to them. Fire support agencies not under the command or control of the force commander are mentioned in paragraph 1b of the operation order. Fire support agencies under the force commander's control are listed in appropriate subparagraphs of paragraph 3; as a

minimum, the artillery organization for combat is given in paragraph 3.

c. *Fire Support Plan.* The fire support plan is the announcement of the commander's decisions concerning the employment of fire support. It is the coordinated and integrated plan for the employment of all fire support available to the commander. The fire support plan amplifies the fire support portion of the commander's concept of operation (*a* above) by providing specific information and instructions relative to fire support.

- (1) The fire support plan is published as an annex to the force operation order. Its form (app. II), is, in general, that prescribed for the operation order.
- (2) Appendixes to the fire support plan annex are published as required in whatever form is most appropriate (app. III). Listed below are examples of some of the appendixes that may be required:
 - (a) Fire plans of organic weapons (regiment and battalion level).
 - (b) Artillery (including guided missiles) fire plan.
 - (c) Naval gunfire plan.
 - (d) Air support plan.
 - (e) Atomic fire support plan.
 - (f) Other plans, instructions, or information, as appropriate.
- (3) (a) The fire support coordinator is responsible that the component parts of the fire support plan are prepared by the appropriate representatives of the fire support agencies concerned and specifically that the plans for the various means of fire support are integrated and coordinated throughout their development and enactment.
(b) He is further responsible during the operational phase for the coordinated application of fire support, but the details of that application are the responsibility of the representatives of the fire support agencies concerned.

251. Assignment of Missions

a. Missions are based upon targets reported by forward observers, air observers, other sources and agencies, or fires called for by the higher or supported unit or force. More than one means of fire support may be used to attack a target.

b. In selecting the means of fire support for a particular mission, the supported or force commander and the fire support coordinator may consider the following factors:

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- (1) Type of fire support requested or called for.
- (2) Nature and characteristics of the target.
- (3) Effect desired on the target, such as neutralization, destruction, interdiction, or others.
- (4) Characteristics of the weapon and its ammunition, e. g., accuracy, mobility, range, and ability to mass fires.
- (5) The most economical means of delivery.
- (6) Availability, based upon allocations and established priorities, of the various types of fire support means and their ammunition supply.
- (7) Relative difficulty of ammunition supply.
- (8) Speed of execution.
- (9) Problems of weather and terrain.
- (10) Vulnerability of the means to be used.
- (11) Morale effect on enemy and friendly troops.
- (12) Effect of suppression of friendly fires during an air strike if required.
- (13) Communication facilities available.

252. Operation

Fire support coordination is effected without adversely affecting any of the present methods used for obtaining delivery of fire.

a. Artillery. When artillery fire is to be employed to attack a target, the artillery commander determines whether the target is suitable for attack by available artillery. If the mission can be fired by the artillery available to the echelon concerned, it is fired in the normal manner. If other artillery fires are required, they are requested from the next higher artillery echelon.

b. Naval Gunfire. When naval gunfire is to be employed to attack a target, it is fired by the direct or general support ship(s) of the echelon concerned, using naval gunfire procedures. If additional naval gunfire is required, assistance is requested of the next higher FSCC.

c. Air Support. When aircraft are to be employed to attack a target, requests for immediate air support are submitted from battalion FSCC (or from regimental FSCC, if the requests originated at regiment) direct to division FSCC, then direct to JOC. Such requests are monitored by intermediate echelons' FSCC's which indicate approval by remaining silent. Requests for preplanned air support are forwarded to each successive higher FSCC, and from corps FSCC to JOC. Requests for support from allocated aircraft are discussed in paragraph 249.

CHAPTER 16

PROCEDURES AND TECHNIQUES FOR HANDLING TERRESTRIAL TARGET INFORMATION

Section I. GENERAL

253. General

The conversion of target information into target intelligence may be facilitated by the use of the techniques described herein. The general procedures involved in the production of target intelligence are discussed in chapter 10 and the use of target intelligence in target analysis is covered in chapter 11.

254. Scope

This chapter describes techniques and procedures suitable for the processing and dissemination of countermortar, counterbattery, and general target information. It also includes sections on shelling reports and crater analysis. The scope is limited to a discussion of techniques and procedures applicable to artillery echelons above the battalion.

Section II. PROCESSING TARGET INFORMATION

255. General

The evaluation and interpretation of target information (ch. 10) is facilitated by recording and plotting the information on appropriate forms, records, and charts. The minimum number of such forms, consistent with providing a clear and concise record of targets, should be maintained.

256. Terms

Certain terms, commonly used in processing target information, require explanation. The terms to be used and the criteria for their use are matters for the commander to decide. In determining the requirements for terms and their meanings, consideration should be given to such factors as the terrain, the enemy's employment of artillery, the weather, and characteristics of the enemy's weapons. Examples of terms that may be required and suggested definitions are given below.

[REDACTED]

a. A *battery* is an enemy position in which is found any of the following:

- (1) Two or more artillery weapons of light or medium caliber.
- (2) One or more artillery weapons of heavy caliber.

b. A *roving gun location* is the position area from which a roving gun (SR 320-5-1) is fired or from which a roving gun is suspected of being fired.

c. An *artillery (mortar) location* is an area sufficiently small in size to permit efficient attack with available weapons and which is known or suspected of containing enemy artillery weapons (mortars).

d. A *suspect artillery (mortar) location* is an artillery (mortar) location concerning which there is doubt as to whether it is occupied, unoccupied, or a dummy position.

e. A *confirmed artillery (mortar) location* is an enemy artillery (mortar) position, the existence and location of which has been verified by sufficient evidence to justify the conclusion that it is occupied by enemy artillery (mortars).

f. A *confirmed battery location* is an enemy artillery position, the existence and location of which has been verified by sufficient evidence to justify the conclusion that it is occupied by the number of weapons constituting an enemy battery of that caliber. An example of the criteria that may be used in confirming a battery is—

- (1) The location has an evaluated accuracy and is associated with a shelling or radar ranging report which indicates that an actual battery, not a deception device or installation, occupies the location.
- (2) Direct observation reveals that a battery occupies the location.

257. Recording Information

Artillery S2's maintain records of two general types: counterbattery (mortar) records and general target information records. These records are discussed below.

a. Counterbattery (Mortar) Records.

- (1) *The artillery counterfire information form (ACIF)* (par. 282). This form is used in recording and transmitting shel-reps and information relative to hostile battery (mortar) positions. Information from this form is plotted on the hostile battery (mortar) chart and the shelrep overlay.
- (2) *The counterbattery intelligence map*. This is a contoured map or an aerial mosaic of suitable scale and accuracy. A contoured map is preferred. This map is covered with an overlay on which are plotted appropriate unit boundaries.

friendly front lines, and all confirmed and suspect hostile artillery locations.

- (3) *The hostile battery (mortar) chart.* This chart is a map, photo map, or grid sheet of suitable scale and accuracy. On it are plotted unit boundaries, friendly front lines, and all confirmed artillery locations or batteries (mortars).
- (4) *The suspect location overlay.* This overlay is attached to the hostile battery (mortar) chart and is used in conjunction with that chart to show suspect locations.
- (5) *The shelrep overlay.* This overlay is attached to the hostile battery (mortar) chart and is used in conjunction with that chart and its other attached overlays. On it are plotted areas shelled and rays indicating the direction toward enemy artillery (mortar) activity. Since the area shelled information on this overlay is valuable in preparing the artillery periodic intelligence report (par. 264), the overlay, which is changed every 24 hours, coincides with the period covered by the S2 periodic report. The old overlays are filed when the new overlay is initiated. By superimposing several recent overlays upon each other, changes in the location of the mass of hostile artillery fire and new suspected areas may be noted and evaluated.
- (6) *Roving gun location overlay.* This overlay, when used, is attached to the hostile battery (mortar) chart and is used in conjunction with that chart to show roving gun activity.
- (7) *Hostile battery (mortar) file.* This is a card file in which is kept a target file card (fig. 14) for each suspect artillery (mortar) location, roving gun location, and confirmed artillery (mortar) or battery location. The location designation and its complete history are recorded on this card. Confirmed batteries (mortars), suspect batteries (mortars), and roving gun locations are filed in separate sections.

b. *Records for General Target Information.*

- (1) *S2 journal.* The S2 journal is a chronological record of events affecting the S2 section. The format and method of recording is as prescribed for a staff section journal.
- (2) *S2 situation map.* This is a map or photo map of a suitable scale covered with an overlay on which are posted friendly and enemy front lines, division and corps boundaries, and all available information of the enemy. The map is used for planning harassing and interdiction fires and fires to support an attack or defense. Fire plans should be checked against this map to insure that all appropriate targets are attacked.

~~Security Information~~

(3) *General target overlay.* This is an overlay used in conjunction with the S2 situation map on which are plotted all enemy locations determined to be targets.

(4) *General target file.* This is a file in which a target file card is kept for each target located, except hostile artillery and mortar locations. The complete history of the target is recorded on this card (fig. 14). This file enables the S2 to

TARGET FILE CARD

TARGET NAME
OR
CONC. NO. BEG

FIRE REQUESTED BY CORPS ARTY S3

	TARGET	SOURCE	DATE TIME
DESCRIPTION	4 MEDIUM HOWITZERS	P1 PW Z	111432 112200 120415
VULNERABILITY & RECUPERABILITY	DUG IN, NO OVERHEAD COVER	"	"
DENSITY & DISTRIBUTION	UNIFORM		
CAPABILITY	Z/A 21ST INF DIV	"	"
GRID REFERENCE	45369452	"	"
ALTITUDE	412 METERS		"
ACCURACY	50 METERS	"	"
SIZE & SHAPE OF AREA	ESTIMATED DIAMETER: 100 METERS	"	"
TERRAIN	ROLLING WOODS	"	"
WEATHER	CLEAR	"	"

RECOMMENDED PRIORITY: II

① Obverse side
RECORD OF FIRES

DATE & HOUR FIRED	120530				
FIRED BY	87 FA BN 92 FA BN				
AMMUNITION	155 HE, VT 8" HE, FQ				
NO. OF ROUNDS	108-155 48-8"				
EFFECT - REPORTED BY	UNKNOWN				

POST ATTACK ANALYSIS

REPORTED BY	DATE TIME	ESTIMATED CASUALTIES	EQUIPMENT DAMAGE	ACCURACY	REMARKS
CORPS AIR OP	120545	25	FIRE BURNING IN POSITION AREA	EXCELLENT	APPARENTLY OUT OF ACTION
92 FA BN	151600	35	2 MED HOWS. DESTROYED	"	

② Reverse side

Figure 14. A type target file card (may be reproduced locally).

correlate reports of enemy activity at a given location. The target file card is useful in the examination of overrun positions and the evaluation of effectiveness of friendly fires and discerning enemy tactics and technique of employment.

258. Plotting Targets

The employment of a standard notational system facilitates the integration of information received in a variety of forms from numerous different agencies into a flexible, simple, and usable form. Although experience or the requirements of a given situation may indicate improvisation, the following described system permits the recording of the bulk of information normally received in the S2 section.

a. Plot Description. Each location is plotted on the appropriate maps, charts, or overlays. The plot should include the location name or number; time and date last reported active; description of the target, such as the number, caliber, and type of weapons; and the reporting source or agencies.

b. Color Code. Colors may be used in plotting to permit selection according to accuracy of location. For example—

Red—Accuracy of 100 meters or less.

Blue—Accuracy between 101 and 200 meters.

Brown—Accuracy between 201 and 300 meters.

Green—Accuracy of 300 meters or over.

c. Identification of Reporting Source or Agency. The abbreviations most commonly used to identify the reporting source or agency are—

SR—Sound Ranging.

RR—Radar Ranging.

FR—Flash Ranging.

Z—Shelling Reports.

TA—Tactical Air Observer.

PW—Prisoner of War.

AOP—Air Observer.

OP—Ground Observer.

PI—Photo Interpreter.

d. Plot Designation. Reported target locations may be designated by a name or a concentration number. Hostile artillery and mortars are generally designated by names and other targets usually are assigned concentration numbers.

(1) Hostile artillery locations are named serially in the order plotted, as AA (1st location), AB (2d location), AC (3d location), * * * BA (27th location), * * *. These plots are

[REDACTED] Security Information [REDACTED]
placed on the suspect location overlay until confirmed. When a location is confirmed, the plot is removed from the suspect location overlay, plotted on the hostile battery chart, and the letter "C" (confirmed) is added to the name, as AAC, BAC, or BBC. The corresponding card in the hostile battery file is changed accordingly.

- (2) Hostile mortars are named in the order plotted in a manner similar to that used for designating hostile artillery locations: MAA (1st location), MAB (2d location), and MBB (28th location). These plots are placed on the suspect location overlay until confirmed. When the location is confirmed, the letter "C" is added to the name of the mortar location, the plot is removed from the suspect location overlay and placed on the hostile mortar chart, and the appropriate change is made in the hostile mortar file.
- (3) Locations other than hostile artillery or mortars are identified by previously assigned concentration numbers.

e. *Description of Target.* An abbreviated description of the target's composition is included as a part of the plot.

- (1) The description of hostile artillery locations includes the number, caliber, and type of weapons, as—
 - 4/M/H —Four medium howitzers.
 - 1/?/? —One weapon, caliber and type doubtful.
 - 3/H/? —Three heavy weapons, type doubtful.
 - 4/150/G—Four 150-mm guns (show exact caliber when known).
- (2) Mortar locations are described as to the number and type of mortars therein, as—
 - 4/Lt—Four light mortars.
 - 1/? —One mortar, type doubtful.
 - 1/Hv—One heavy mortar.
- (3) General target locations are described by using an appropriate military symbol (FM 21-30), abbreviation, or by improvising some other intelligible notation.

f. *Completed Plot.* The completed plot (fig. 15) consists of the basic symbol, appropriately colored, with notations placed in each quadrant. A commonly used system for entering notations is given below.

- (1) Upper left—name or concentration number of location.
- (2) Upper right—date and time last active. (If derived from photo interpretation report, the date and time the photo was taken are shown.)

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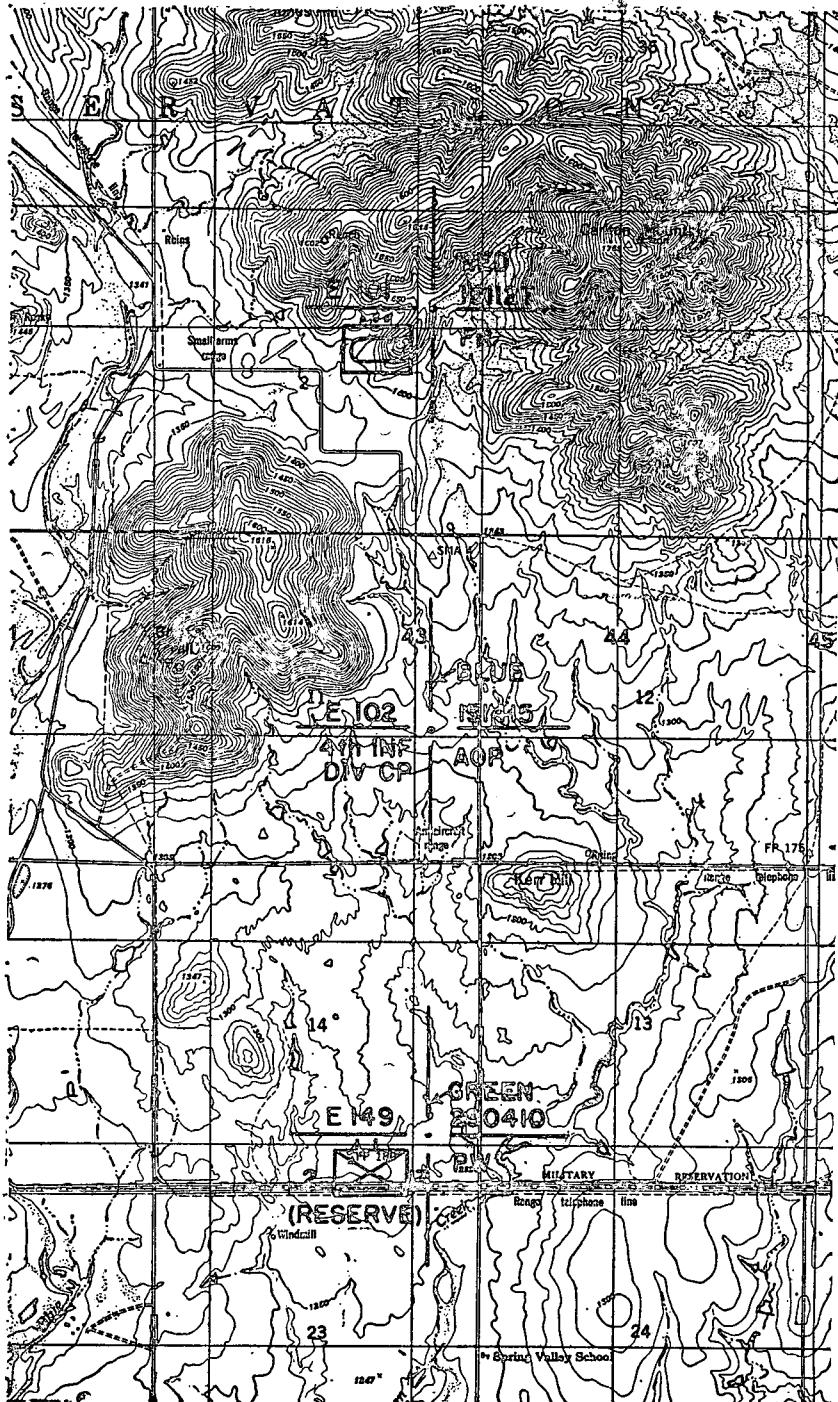


Figure 15. General target plots.

~~Security Information~~

(3) Lower right—agency reporting. More than one may be shown.

(4) Lower left—description of target.

g. Changes in Target Status. The plots of targets are changed to conform to the target's known status. For example, the color of the basic symbol may be changed to reflect the report of a more accurate location or the plot may be removed from the suspect location overlay and replotted on the hostile battery (mortar) chart when the location is confirmed (*d* above). When a target location is reliably reported to be vacated, its plot is removed from the general target overlay or the hostile battery (mortar) chart and, in the case of artillery (mortars), the plot is reentered on the suspect location overlay. Regardless of the type target location now reported to be vacant, the target file card is retained in the suspect section of the appropriate file for reference if the location is reoccupied and to facilitate post attack analysis (par. 186).

259. Shelling Reports

a. Shelling reports are plotted (fig. 16), as received, on the shelrep overlay.

(1) The basic symbol is a ray whose origin is at the observer's reported location. However, if the shelling report is based on measurements taken at the crater or furrow, the area shelled ((3) below) is the origin of the ray. In the case of "Flashbang" reports (par. 279), the rays are drawn with tick marks which correspond to the ranges determined from reported time intervals.

(2) To permit rejection of false intersections, the rays are usually drawn according to a color code. For example:

Red —Heavy caliber weapons.

Blue —Medium caliber weapons.

Green—Light caliber weapons.

Black—Unknown.

(3) When the area shelled is reported, it should also be shown on the shelling report overlay. Notations concerning the number and caliber of the shells fired, the nature of the fire, and the time fired are desirable.

(4) Notations are placed on the ray to identify the shelrep. Notations normally include the time of firing, the ACIF number, and information concerning the number, caliber, and type of weapons.

b. Shelreps are evaluated upon receipt as to accuracy and reliability (par. 193). When a shelrep is plotted on the shelrep overlay it is considered in conjunction with the hostile battery chart, attached overlays, and any other pertinent information available. If the shelrep establishes the activity of a hostile location an entry is made on the appropriate target file card. The information is plotted on the coun-

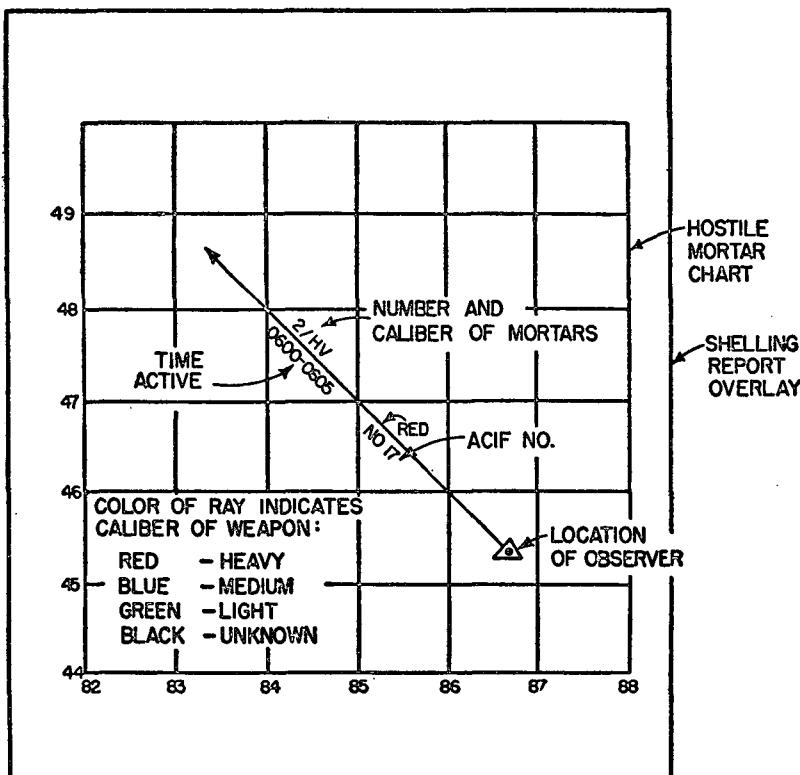


Figure 16. Shelling report plot of information from artillery counterfire information form.

terbattery (countermortar) intelligence map and S2 situation map. When appropriate, the information is passed to the S3 for information and necessary action. When the azimuth or location is unrelated to any plotted location, a careful study is made taking into account weapon type and caliber to determine likely tactical positions. Intelligence agencies may be directed to seek further information in these areas.

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Section III. MEANS FOR THE DISSEMINATION OF TARGET INFORMATION

260. General

Methods commonly used for disseminating combat intelligence and information are discussed in FM 30-5. These methods consist of conferences, messages, and intelligence documents. The most rapid means of dissemination of information or intelligence is by radio, telephone, teletypewriter, or other electronic devices. The following paragraphs describe those documents of particular interest to the artillery.

261. Hostile Battery (Mortar) List

This is a list of hostile locations compiled for transmitting information to all interested units. *Confirmed* and *suspect* locations are listed separately. Complete hostile battery (mortar) lists are numbered, dated, and published at the direction of the appropriate commander. They are kept up-to-date by additions, deletions, and changes published in the artillery intelligence bulletin (par. 262).

262. Artillery Intelligence and Information Bulletins (App. II)

a. Artillery intelligence bulletins are published at the direction of corps artillery and division artillery commanders. This bulletin contains information and intelligence derived from subordinate, adjacent, and higher artillery echelons and from G2 reports and bulletins. Distribution is made in accordance with the commander's desires.

b. An artillery information bulletin is published by the artillery commander (officer) at army and theater army levels. This bulletin is a compilation of information and intelligence concerning personnel, intelligence, operations, and supply. It is published periodically, usually monthly. Fruitful sources of intelligence and information for the information bulletin are subordinate units' reports and other bulletins. Distribution should be made to include all artillery battalions with the command.

263. Target Summary (App. III)

Target summaries are lists of hostile artillery (mortar) and general target locations compiled from the latest available information in the hostile battery (mortar) and the general target files. They are used for transmitting targets to the S3 and for disseminating target information to superior, adjacent, and subordinate units. Complete target summaries are numbered, dated, and published at the direction of the appropriate commander. They are kept up-to-date by additions, deletions, and changes published in the artillery intelligence bulletin (par. 262).

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a. All of the target characteristics (par. 206), insofar as these are known, are listed in the target summary. The target summary may include targets previously fired upon unless it is definitely known that the target has been destroyed or the location vacated.

b. The target summary may also indicate a recommended priority for each target (par. 206).

264. Artillery Periodic Intelligence Report

This report (app. II) is a summary of the enemy capabilities (corps artillery only), situation, operations, and of the weather and terrain. The period of time to be covered by the report is either specified by higher headquarters or by the unit commander in the absence of such instructions. Normally the report covers a 24-hour period.

Section IV. COUNTERBATTERY ACTIVITIES

265. General

a. Counterbattery intelligence has as its objective the gathering of complete information pertaining to hostile batteries. In this respect, counterbattery intelligence does not differ from other phases of military intelligence. Its immediate operational objective is attained when the units of the firing echelon are provided with the information which they require to attack known hostile battery locations successfully.

b. Counterbattery intelligence serves a broader function when its product is integrated into the whole of the intelligence effort. Important tactical deductions, independent of the operation of attacking hostile batteries, may be derived from positive knowledge of the enemy artillery strength and dispositions.

c. Successful counterbattery intelligence depends on the coordinated employment of contributing intelligence agencies and on the systematic recording and evaluation of assembled data.

266. Counterbattery Activities

a. Responsibility and Organization.

- (1) The corps artillery commander is responsible for counterbattery activities and has been provided intelligence agencies and staff to perform this mission.
- (2) When the operations of a division require the division artillery to assume the responsibility for counter-battery activities, necessary counterbattery means must be attached to the division.

(3) The S2 of corps artillery is responsible for supervising the collection and recording of all possible information of enemy artillery, antiaircraft artillery, and antitank guns. From this information, the S2 selects remunerative targets and transmits to the S3 a detailed description of each target so that the S3 can readily decide how the target is to be attacked.

b. Counterbattery Policy. In every situation it is necessary for the commander responsible for counterbattery operations to enunciate a counterbattery policy. This policy will be the commanders concept of the employment of his artillery in the counterbattery role. The policy is continually scrutinized and revised as necessary in accordance with the changing situation. The complexity of the considerations involved in determining a counterbattery policy requires detailed staff coordination. Some of the considerations affecting the determination of the counterbattery policy are—

- (1) The mission of the supported force.
- (2) A knowledge of the tactics and technique of employment of the enemy's artillery and other heavy weapons.
- (3) The amount of artillery in the enemy force and the degree to which it is active.
- (4) A knowledge of the enemy's capability for reinforcing his artillery.
- (5) An estimation of our capabilities to locate enemy artillery positions.
- (6) An estimation of our ability to deliver effective fire on enemy artillery locations by appropriate means.
- (7) A knowledge of the strength, status, and morale of enemy artillery units.
- (8) A knowledge of the intensity or type of fire required to achieve the effect desired upon the enemy artillery locations.
- (9) A knowledge of the enemy capability of locating our artillery and delivering effective fire on our battery positions.
- (10) Employment of deception techniques to reduce the enemy's capability for locating our artillery positions.
- (11) A knowledge of the communication systems employed by enemy artillery commanders and the location of enemy communication installations.
- (12) Ammunition available to support the counterbattery policy.

c. Execution of Counterbattery Fires. Counterbattery fire on active artillery should be delivered while the hostile battery is firing. Hostile batteries should be attacked with surprise fire. Time and ammunition permitting, batteries once neutralized should be destroyed by fire.

The observation battalion can often determine the accuracy of unobserved fires by sound, flash, or radar.

d. Evaluation of Counterbattery Fires. During the course of operations, a continuous evaluation of the effect of counterbattery fires on hostile artillery should be made (par. 186).

267. Functions

Within the corps artillery headquarters, the counterbattery function is divided between the S2 and S3 sections.

a. The S2 and his assistants are responsible for producing counterbattery intelligence. Counterbattery intelligence includes the location and identification of hostile batteries, the study of the tactics and techniques of hostile artillery employment, and the determination of enemy artillery capabilities and limitations.

b. The S3 and his assistants are responsible for counterbattery operations. Counterbattery operations include the action taken to neutralize or destroy hostile artillery.

c. Counterbattery intelligence has a scope which carries it beyond the field of counterbattery operations. Knowledge of hostile artillery dispositions and strength has an important bearing on tactical decisions affecting the whole force.

268. Agencies Contributing Counterbattery Information

a. There are numerous information agencies directly or indirectly available to the assistant S2, counterbattery intelligence officer (CBIO). The skillful CBIO (fig. 5) must coordinate the activities of these agencies so as to exploit their points of strength and minimize their points of weakness.

b. The following agencies are normally available to the CBIO.

- (1) Field artillery observation battalion (par. 88).
- (2) Field artillery air observation (par. 64).
- (3) Photo interpretation (par. 196).
- (4) Shelling reports and shell crater analysis (par. 193).
- (5) Ground observation posts (par. 64).
- (6) Prisoners of war and civilian interrogation.
- (7) Tactical reconnaissance aviation (par. 195).
- (8) Radio intercept (par. 194).
- (9) Higher and adjacent units.

269. Specific Duties of the CBIO

The CBIO (par. 225) assists responsible members of the corps artillery staff by furnishing counterbattery information as required to develop a counterbattery fire plan in the conduct of deliberate opera-

tions, to develop an estimate of the hostile artillery situation for the force commander and higher headquarters, and to enable an intelligent discrimination in the selection of counterbattery targets of opportunity. In addition, he—

- a. Coordinates the activities of contributing counterbattery intelligence agencies.
- b. Collects counterbattery information.
- c. Evaluates and interprets counterbattery information received.
- d. Records counterbattery information.
- e. Disseminates counterbattery information.
- f. Instructs and familiarizes personnel with the corps in their counterbattery responsibilities (par. 193).
- g. Provides for post attack analysis.

Section V. COUNTERMORTAR ACTIVITIES

270. General

a. Countermortar intelligence has as its objective the reduction of uncertainties related to the location of hostile mortars. Its immediate operational objective is attained when the firing units are provided with the information necessary for successful attack of known hostile mortars.

b. The most difficult countermortar problem is locating the position, or even the area, from which these weapons are firing. Because mortars possess the capability of displacing frequently and quickly, speed in the handling of countermortar information is essential. The process of countermortar activities is speeded up by decentralization to facilitate rapid communication between the sources of information and the means for neutralization of hostile mortars and maintenance of the minimum number of records, charts, and forms required to provide a clear, concise record of enemy mortars.

271. Division Organization for Countermortar Operations (Fig. 17)

Success in countering the activities of hostile mortars is dependent upon the efficiency with which countermortar activities are organized. A good organization for countermortar operations provides for the exploitation of all possible sources of countermortar information, fast and efficient processing of countermortar information, and rapid dissemination of pertinent information to appropriate personnel and units. Close cooperation between the supported infantry units, the direct support artillery, and division artillery is required.

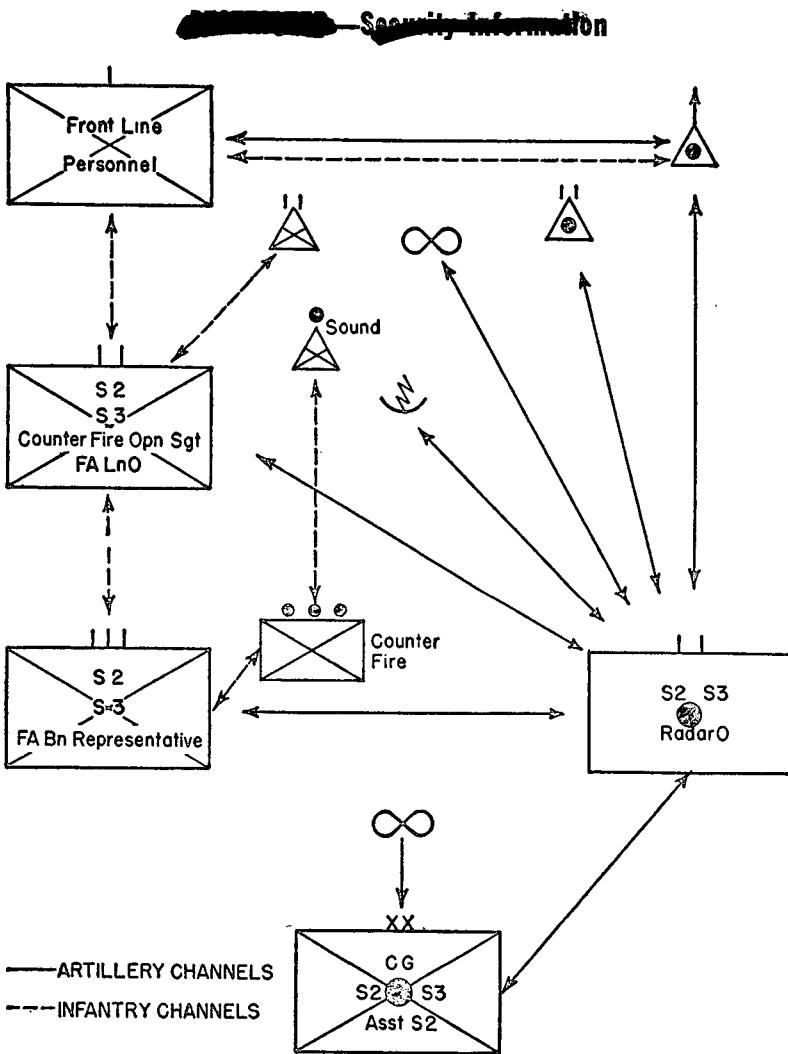


Figure 17. Division organization for countermortar operations.

a. The coordination of the division's countermortar activities is the responsibility of the division artillery commander. In the discharge of this responsibility he is assisted by—

- (1) The division artillery S2 who is concerned with all intelligence.
- (2) An assistant S2, countermortar intelligence officer (CMIO) (fig. 4). Under the supervision of the S2, he collects, processes, and disseminates all obtainable information and intelligence concerning hostile mortars. He advises the division artillery commander concerning the general employment of

the radar sections of the light battalions and assists the division artillery S2 in the assignment and coordination of their sectors of search (par. 225).

- (3) The division artillery S3 who utilizes the division artillery and reinforcing weapons for the most effective attack of hostile mortars.
- b. Countermortar activities within the infantry regiment involve—
 - (1) The regimental S2 who collects, processes, and disseminates countermortar information and intelligence.
 - (2) The regimental S3 who supervises the countermortar activities within the infantry regiment to include supervision of the organic counterfire platoon. This platoon is organized and equipped to operate short-range, sound locating instruments for the purpose of locating enemy weapons (FM 7-25). The counterfire information center established by the counterfire platoon is the focal point for all counterfire information originating within the regiment.
 - (3) The direct support artillery's representative who assists in countermortar activities. He cooperates fully with the infantry in securing artillery fire and coordinating the activities of the field artillery battalion countermortar radar section with the infantry counterfire platoon.
- c. Countermortar activities within the infantry battalion involve—
 - (1) The infantry battalion S2 who is charged with countermortar intelligence.
 - (2) The infantry battalion S3 who supervises the countermortar operations of the battalion.
 - (3) The field artillery liaison officer with the infantry battalion who assists in coordinating artillery and infantry fires and in disseminating information.
- d. Divisional field artillery battalions are organized for countermortar activities as follows:
 - (1) The S2 is charged with the location of targets, including mortars, and the recommendation of fire missions to the S3. He expedites the flow of information concerning mortars to the artillery representatives with the infantry, and to division artillery.
 - (2) The S3 executes countermortar fires according to the existing situation and availability of weapons.
 - (3) Each divisional light field artillery battalion is authorized a countermortar radar section whose primary mission is the location of mortars (FM 6-101). The section is supervised

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by a radar officer, who is responsible for the training, tactical and technical proficiency of personnel, and maintenance of the organic radar equipment.

272. Communication

As speed is essential to countermortar action, the organization for countermortar operations must have efficient means of communication for the flow of information and for calling on the most suitable weapons for fire. In most instances the normal communication systems will suffice, but additional facilities may become necessary for the rapid transmission of information. Artillery communication channels are normally utilized for countermortar activities.

273. Methods of Locating Mortars

Enemy mortars may be located by a variety of methods (par. 268). Included in the available methods are—

- a. Sound, flash, and radar ranging and visual observation (pars. 64 and 88).
- b. Mortar reports and crater analysis (par. 193).
- c. Aerial photographs (par. 196).
- d. Studies of enemy-held terrain for probable target locations (target prediction).
 - (1) A study of enemy terrain may be made from available sources such as maps, aerial photographs, and air and ground reconnaissance. This and allied information, together with a knowledge of the enemy's organization and tactical doctrine for mortars, will enable countermortar personnel to make a reasonable deduction of hostile mortar locations.
 - (2) A continuous comparison should be made between the number of hostile mortars located and the estimated number on the front to enable estimate of progress being made. An estimate of the number of opposing mortars may be derived from experience, order of battle information, and knowledge of the enemy's situation.
 - (3) After enemy territory has been overrun, a study of hostile mortar locations should be made (par. 186). This will assist in future countermortar work by revealing—
 - (a) The average number of mortars in a unit.
 - (b) The use of alternate and dummy positions.
 - (c) The typical location and organization of mortar positions.
 - (d) The accuracy of countermortar fires.
 - (e) The efficiency of the countermortar intelligence systems.

274. Countermortar Operations

The organization for countermortar activity is decentralized in order to obtain the maximum speed in dealing with enemy mortars that are located. The exchange of information between artillery and infantry is conducted through the artillery representatives at the infantry headquarters.

a. Countermortar information originating in the infantry battalion is plotted and interpreted immediately upon receipt by the battalion S2. When such information indicates a probable hostile mortar position, fires by the most effective available weapons are requested without delay. Complete information and report of action taken is forwarded immediately to the regimental counterfire information center.

b. The operation of the regimental countermortar organization is analogous to that of the infantry battalion. The counterfire information center plots all reports and gives the S3 recommendations for suitable action against those targets located. Information obtained and a report of action taken is passed immediately by regiment to the direct support artillery.

c. Operations of the countermortar organization within the direct support artillery is the same as for any other type target discovered by the artillery except for the priority given countermortar messages, the emphasis placed on the exchange of countermortar information with the infantry, and the immediate passing of complete information to division artillery.

Section VI. SHELLING REPORTS

275. General

a. Whenever and wherever hostile artillery, rocket, or mortar shelling or hostile bombing is observed, it must be reported without delay to the appropriate headquarters which can evaluate and act upon the information. This report is forwarded in accordance with the format and procedure prescribed in paragraphs 279 and 280.

b. Shelling and bombing reports form the basis of efficient counteraction to enemy fire. In addition to providing information that assists in the initial location of hostile weapons, shelling and bombing reports further aid counterbattery, countermortar, and air defense operations by—

- (1) Indicating *when* enemy weapons are firing.
- (2) Indicating *which* weapons or planes are active.
- (3) Indicating *number, caliber, and type* of active weapons.

- (4) Reporting *effectiveness* and indicating *purpose* of enemy fire.
- (5) Aiding in defining enemy fire *capabilities*.
- (6) Furnishing information which permits efficient application of additional and confirming means of target location.

276. Reporting Types of Shells

- a. Shells or fragments not positively identified should be reported immediately to proper authorities. For technique of fragment analysis, see TM 30-240.
- b. To be of maximum value, fragments should be tagged with the following information:

- (1) Date and time shell landed, if known.
- (2) Location where shell was found, as accurately as possible.
- (3) Direction from which shell came and method used in determining that direction (survey of crater, sound, etc.).
- (4) Name and organization of person making report.
- (5) Reference to shelling report on which this shell was reported, if known.

277. Specific Values of Reports

a. *Artillery Shelling (SHELREP) and Mortar Shelling (MORTREP) Reports.* Shelling reports furnish valuable information of the disposition and activities of the hostile weapons. By a detailed analysis of shelling reports, the artillery intelligence officer obtains information that may permit the location of hostile weapons and permit effective employment of counterfire.

b. *Bombing Report (BOMBREP).* Bombing reports provide valuable information to the intelligence sections of higher headquarters, both air and ground. They are used in preparation of enemy air order of battle studies. Through proper processing and analysis, they give indications of enemy air capabilities and intent as well as new developments, tactics, and doctrine.

278. Detail and Accuracy

The most reliable, accurate, and informative reports of hostile shell-ing or bombing are based on visual or electronic observation supplemented by crater analysis and fragment identification. Reports (SHELREP, MORTREP, BOMBREP) should be as detailed and accurate as the necessity for speed will permit. No individual should neglect or delay a report due to lack of complete information. Fragmentary or incomplete information is often of value in supplementing or confirming existing information. All personnel, regardless of arm

or service, must be made aware of the necessity for promptly reporting shelling or bombing information that comes to their attention. However, the greatest volume of usable reports is submitted by specially trained personnel. Provision should be made for training of such specialists within units of company size and larger.

279. Content of the Report

Items to be covered in the shelling and bombing report are transmitted in the following sequence:

a. A. From. This paragraph identifies the source of the report. The current call sign or code name is used.

b. B. Position of Observer. A map reference is preferred, however such a reference must be encoded by the use of a grid reference code, map template, thrust line, or some other security means. The location of the observer is essential for plotting the azimuth reported in column C.

c. C. Grid or Magnetic Bearing Azimuth of Flash, Sound, or Groove of Shell in Mils or Degrees. The observer must state whether he is reporting a grid or magnetic direction, how he determined the direction (whether from seeing the flash, hearing the sound, or sighting along the shell's furrow), and the units of measure (mils or degrees) he has used. The direction is measured from the observer to the enemy weapon. This column is omitted from Bombreps. The azimuth to the suspected hostile area can be determined—

- (1) By sound. Estimation of direction by ear is the most common and the most inaccurate method used. It should be confirmed by other methods whenever possible. Hearing the gun fire and measuring the azimuth to the area from which the sound seemed to come or hearing the passage of a shell and measuring the azimuth of its apparent course are the two methods most often used.
- (2) By seeing the flash. This method is very accurate. However, since flash simulators may be used, the location obtained must be confirmed by other methods wherever possible.
- (3) By crater and furrow analysis (pars. 284-291).

d. D and E. Time from (D) and Time to (E). The time that the shelling or bombing commenced and ended should be given accurately. It may be that the weapon's location can be confirmed by sound or flash locations which were taken at the same time or that reports of two or more observers may be combined. The report is not delayed until the shelling or bombing ceases. A fragmentary report is submitted immediately, followed by a complete report when obtained.

e. F. *Area Shelled or Bombed.* The area shelled or bombed is preferably identified *in the clear* by map reference. The precision with which targets are attacked by the enemy may indicate the enemy's employment of forward observers, photographs, map data, or sound, flash, and radar units. The intensity or the persistency of shelling or bombing may indicate the value of the target to the enemy, the status of his ammunition supply, and whether the fire is for defensive operations or preparation for an attack.

f. G. *Number and Nature of Guns, Mortars, or Aircraft.* The number of guns or mortars is estimated by the time between individual bursts or by the number of bursts that occur within a relatively few seconds. Consideration is given to the caliber of shell and the consequent time needed for reloading. Fragment identification is a method of determining caliber and sometimes type of shells. Initially, the caliber may be estimated as light, medium, or heavy.

g. H. *Nature of Fire (Omitted for BOMBREP).* The nature of fire may generally be classified as registration, destruction, interdiction, harassing, neutralization, or fire against a specific installation. Often the nature of fire indicates the necessity for speed in executing counterbattery fire.

h. I. *Number and Type of Shells, Bombs, etc.* Included in this paragraph is information regarding the kind of shell (high explosive, time, incendiary, gas, etc.) or bomb (fragmentation, cluster, incendiary, napalm, etc.) employed.

i. J. *Time of Flash to Bang (Omit for Aircraft).* One means of establishing the distance from the observer to the gun is by noting the number of seconds between the time the gun flash is seen and the sound of the discharge of the gun is heard by the observer. For practical purposes in computing the approximate distance between the gun and the observer, it is assumed that flashes are seen instantaneously and that the speed of sound is approximately 370 yards (340 meters) per second. The calculation of this distance which is based on the speed of sound has nothing to do with the time of flight of the projectile itself.

j. K. *Damage.* This paragraph states the damage inflicted, thereby providing information which might indicate needed changes in prescribed procedure or action. Clear or encoded transmission will depend on the situation at the time. In some cases, it may be desirable to report damage separately by flash message.

280. General Instructions

a. Because speed is essential to counteraction, the observer transmits information on shellings and bombings by the most rapid means

available. The items and sequence prescribed in paragraph 279 will be used for all reports.

- b. Each report will be preceded by the appropriate code word.
 - (1) SHELREP (in the case of enemy artillery fire).
 - (2) MORTREP (in the case of enemy rocket or mortar fire).
 - (3) BOMBREP (in the case of enemy air attack).
- c. For ease and speed in transmission each paragraph of the text of the report will be identified by a capital letter, e. g., A, B, C. The paragraph title (number and type of shells, bombs, etc.) will not be transmitted.
- d. The message will always be transmitted in the clear except for—
 - (1) Paragraph A (par. 279), the unit. The current call sign or code name is used instead.
 - (2) Paragraph B (par. 279), the location of the observer. When a map reference such as a grid reference is used, it must be encoded.

281. Reproduction in Field Message Books

A list of the essential items of information (par. 279) and the order in which they are to be reported is printed on the inside cover of field message books. Older type message books that do not contain this list can be brought up-to-date by printing the list on a piece of gummed paper and pasting it to the book cover.

282. Artillery Counterfire Information Form

If a shelling report is to be combined with information concerning located hostile weapons and a record of counterfire, the artillery counterfire information form (figs. 18 and 19) may be used. This form may be reproduced locally. On this form, section 1 is the shelling report (par. 279); section 2 pertains to locations of hostile batteries; and section 3 gives data on the action taken by the S3.

a. Section 2. Location of Hostile Weapon.

- (1) *L. From and time.* The designation of the sending agency and time of message are entered in this paragraph.
- (2) *M. Grid reference and accuracy.* The grid reference of the hostile weapon and the estimated accuracy of location are entered in this column.
- (3) *N. Means of locating.* The source of the information such as sound, flash, radar, air, or OP is entered in this column.
- (4) *O. Time active.* The time the hostile weapon was active, including the date if not current, is contained in this column.

(5) *P. Number and type of guns or mortars.* This paragraph contains the number of weapons located, the type (whether light, medium, or heavy) and whether the weapons are guns, howitzers, mortars, or rockets.

(6) *Q. Remarks.* Any additional information of pertinent nature, such as observation or determination of construction of emplacements, location of truck park, activity, or the effects of fire is entered in column Q.

b. *Section 3. Counterfire Action.* This section is completed by the S3 after counterfire has been directed against the hostile weapon's location. This section includes the time of counterfire, the unit firing, the number of rounds fired (including the fuze and projectile used), and remarks concerning the effect of the fire.

283. Transmission

All headings should be included to prevent repetitions of transmissions to determine whether they are purposely omitted or overlooked.

a. The shelling report shown in figure 18 may be transmitted as follows:

SHELREP

ABLE	OBOE PETER 1
BAKER	365478
CHARLIE	GRID AZIMUTH FLASH 1438 MILS
DOG	1250
EASY	1255
FOX	UNKNOWN
GEORGE	2 UNKNOWN
HOW	UNKNOWN
ITEM	18 UNKNOWN
JIG	8 SECONDS
KING	UNKNOWN

b. The radar location shown in figure 19 may be transmitted as follows:

LOVE	1ST FA BN, RADAR, 1257
MIKE	478675 100 METERS
NAN	RADAR
OBOE	1255
PETER	1 UNKNOWN
QUEEN	AREA SHELLED 490650

~~RECORDED~~ Security Information

ARTILLERY COUNTERFIRE INFORMATION FORM																																							
RECD BY <u>A.J.S</u> (INITIALS OF WRITER)			FROM <u>L NO 1</u>		TIME <u>1300</u>			NO <u>7</u>																															
SECTION 1 SHELREP - MORTREP - COMREP (DESIGNATE WHICH)																																							
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TIME C/FIRE	FIRED BY	NO. OF RDS FUZE AND PROJECTILE																																					

Figure 18. Artillery counterfire information form (may be reproduced locally) showing SHBLREP recorded.

ARTILLERY COUNTERFIRE INFORMATION FORM

REC'D BY Y.O.U. (INITIALS OF WRITER) FROM S2 1ST FA BN TIME 1258
 SECTION 1 SHELLREP - MORTREP - BOMREP (DESIGNATE WHICH)

A	B	C	D	E	F	G	H	I	J	K
FROM	PSN OF OBSR	MAG OR GRID AZIMUTH SOUND FLASH OR FURROW	TIME FROM	TIME TO	AREA SHELLED	NO. & NATURE OF GUNS OR MORTARS	NO. & TYPE SHELLS	TIME OF FLASH TO BANG	DAMAGE (REMARKS)	

SECTION 2 LOCATION OF HOSTILE WEAPON

L	M	N	O	P	Q
FROM	GRID REFERENCE	MEANS OF LOCATING	TIME ACTIVE	NO. & TYPE OF GUNS OR MORTARS	REMARKS
1ST FA BN	478675	RADAR	1255	1/?/?	AREA SHELLED 490650

SECTION 3 COUNTERFIRE ACTION

FILL IN			
TIME C/FIRE	FIRED BY	NO. OF FDS AND PROJECTILE	REMARKS (EFFECT)
1300	1ST FA BN	3G FZ 50% FQ 50% FT	UNDER SURVEILLANCE OP # 1

Figure 19. Artillery counterfire information form (may be reproduced locally) showing location of a hostile weapon and action taken.

Section VII. LOCATION OF HOSTILE ARTILLERY BY CRATER ANALYSIS

284. Artillery Shell Crater Analysis

a. The direction of flight of a projectile can be determined with reasonable accuracy from its crater or ricochet furrow. By locating the crater accurately and measuring the direction of flight of the projectile, the azimuth of a ray that will pass through or near the actual artillery position can be obtained. The position area of a battery may be located by plotting the intersection of the average back azimuths from two or more widely separated groups of craters from shells determined to have been fired by the same battery. It is possible to determine the direction to a battery with fair accuracy from the back azimuth obtained from one crater or ricochet furrow.

b. In crater analysis, the differences in slopes of fall, burst patterns of the projectiles, directions of flight, and settings of time fuzes will all aid in distinguishing between hostile artillery units firing on a given area.

285. Uses and Value

By analysis of shell craters, it is possible to—

a. Verify, as confirmed locations, suspected locations that have been obtained by other means.

b. Detect presence and approximate location of enemy batteries not previously suspected.

c. Obtain an early indication of the general location or direction of active enemy artillery.

d. Assist in accomplishing counterbattery intelligence missions.

e. Detect the presence of new type of enemy weapons, new calibers, or new methods of manufacture of ammunition.

286. Inspection of Shelled Areas

Inspection of shelled areas should be made as soon as possible after the shelling. Reverse slopes, folds in the terrain, hedgerows, and buildings in shelled areas offer opportunities for finding ricochet furrows and other markings.

287. Survey for Crater Location

The area must be located sufficiently accurately for plotting on the appropriate chart, map, or air photograph. Deliberate survey methods are not essential; inspection, or inspection and short traverse, using the aiming circle for direction and pacing for distance, is sufficient.

288. Determination of Direction

a. Pattern. A clear pattern produced on the ground by the detonating shell gives an indication of the general direction from which the shell came.

b. Factors Affecting Pattern.

- (1) It must be kept in mind that due to irregularities of terrain and soil conditions, the typical shell crater pattern is the exception, not the rule. The principal parts of the pattern caused by fragmentation are the marks from side spray. There is much less effect from nose spray. Basic spray is negligible with artillery projectiles but appreciable in the case of mortars. The width, angle, and density of the side spray pattern varies with different types of projectiles, the angle of impact, and the projectile's terminal velocity.
- (2) In determining direction, consideration must be given to the effect of stones, vegetation, stumps, roots, variations in density and type of soil, and the slope of the terrain at the point of impact. Out of any group, only those craters most clearly defined and most typical should be utilized.

c. Marks on Vegetation and Other Subjects. The direction from which a round was fired often is indicated by marks left as it passes through trees, snow, and walls. However, the possibility of deflection of the shell upon its first impact with such objects should be kept in mind, and evidence of such deflection should not be overlooked.

d. Drift and Wind Effects. Drift and lateral wind effect do not materially change the direction of the shell's axis during flight, as the rapidly rotating shell is a type of gyroscope. Its ricochet furrow, or other path, usually will be parallel to the plane of fire except when obviously deflected in azimuth.

e. Ricochet Furrows.

- (1) Ricochet furrows usually furnish the best information. The average direction of a few such furrows *from the same battery* will give, under the most favorable conditions, a line that passes fairly close to the battery position. Great care must be taken to determine that the shell was not deflected before or while making this furrow. *At the point where a ricochet changes from a descending to an ascending path, it will often change direction of flight.*
- (2) Carefully remove loose dirt from furrow with hands, leaving smooth, hard channel intact. Drive a stake or survey pin *at each end of the usable straight part of the furrow.* Set the stakes straight and just touching the center line of the

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channel on the same side. These stakes represent the line of fire, the azimuth of which may be measured with an aiming circle (fig. 20).

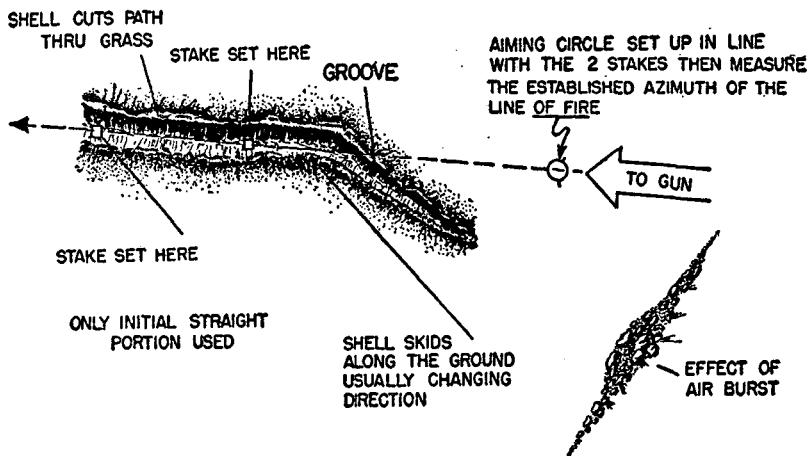


Figure 20. Typical ricochet markings.

f. Fuze-Quick Craters.

- (1) At small angles of fall, fuze-quick craters furnish information nearly as accurate as that from ricochet furrows. Judging the direction of the trajectory increases in difficulty with an increase in angle of impact; therefore, more craters must be analyzed. If the angle of impact is small or moderate, the crater generally is pear-shaped. If the angle of impact is larger, the crater generally is oval with the least diameter in the direction of flight.
- (2) Direction of flight can be found by—
 - (a) Groove in ground where shell entered (fig. 21). Place a stake in center of channel. Place a second stake on opposite side of crater. Sight along these to obtain back azimuth as with ricochet furrows. Position of fuze tunnel or groove may give a good indication of direction of fire.
 - (b) Use of side spray (hatchet stroke) shown by dirt and cut grass. Place a stake near the end of each side spray (hatchet stroke) that will divide the spray in half (fig. 22). Place the aiming circle as accurately as possible over the center of the crater and measure the angle between the stakes. The bisector of this angle is the approximate line of fire, and its back azimuth can be determined.

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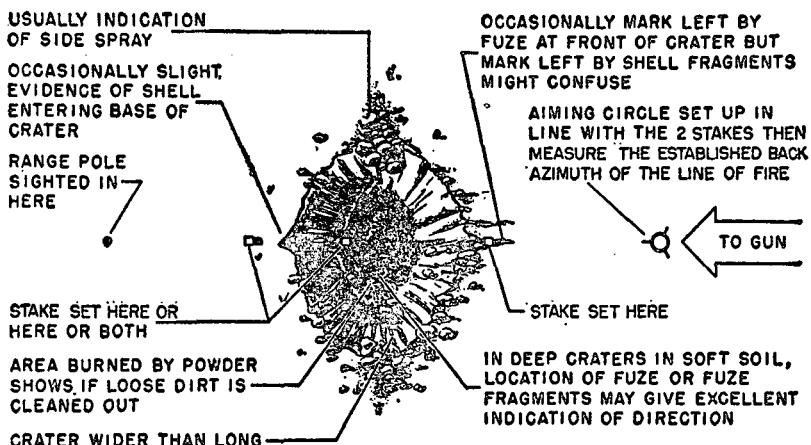


Figure 21. Schematic shell crater fuze quick.

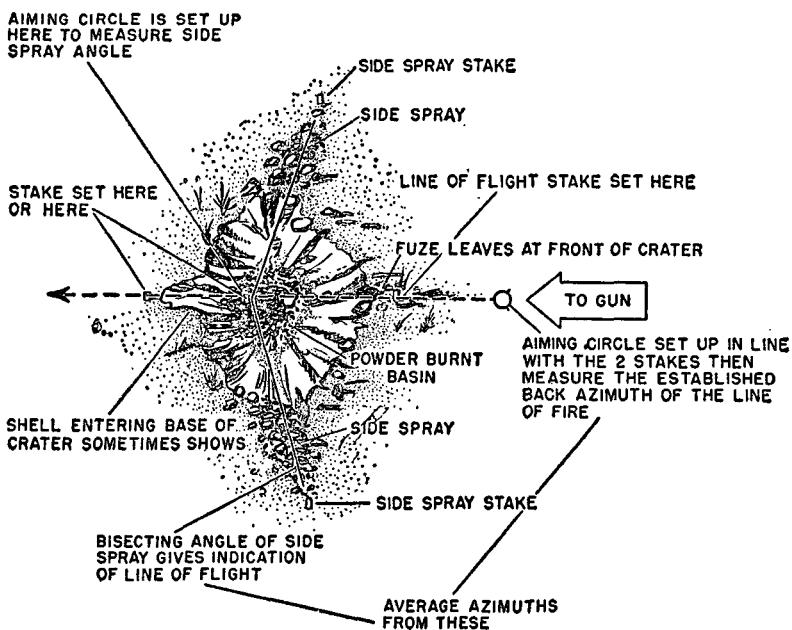


Figure 22. Determination of direction by use of side spray.

(c) The average of the back azimuths obtained from steps (a) and (b) above will be more dependable than from either method alone.

g. Deep Craters. Least reliable directions are derived from deep craters. However, in soft soil, good approximate direction can be

obtained if a nose fuze has been employed. A nose fuze will form a tunnel in prolongation of the shell's line of flight. A line of fire can be established from this tunnel in conjunction with other characteristics. The crater pattern ordinarily will be oval with the least diameter indicating direction of fire.

Section VIII. LOCATION OF HOSTILE MORTARS BY CRATER ANALYSIS

289. Mortar Shell Crater Analysis

Mortar shell crater analysis parallels that of artillery shell crater analysis. It is difficult sometimes to differentiate between the craters of light artillery and heavy mortar projectiles.

290. Appearance of Craters

(Fig. 23)

The appearance of a typical mortar crater is characterized by the following.

a. At the front edge (one farthest from mortar position) of the crater, the turf is undercut (fig. 23) while the back edge is shorn of growth and grooved or streaked by splinters.

b. When fresh, the crater is covered with loose earth which must be removed carefully to disclose the firm, burnt, inner crater (fig. 23).

c. The fuze buries itself in the bottom of the inner crater in front of the point of detonation (fig. 23). In soft ground the fuze will bury itself to a considerable depth along the line of the trajectory.

d. The ground around the crater is streaked by splinter grooves, all of which radiate from the point of detonation (fig. 23). The pattern of these grooves depends on the angle of fall and the type of soil. The ends of the splinter grooves on the rear side of the crater frequently will be on an approximately straight line. This line will be perpendicular to the line of flight when on level ground or on slopes with contours perpendicular to the plane of fire (fig. 24).

291. Technique

a. Drive a stake in the crater with the top at the intersection point of splinter grooves (fig. 24). Carefully remove loose dirt and look for fins and fuze fragments. Do not disturb the firm sides of the fuze tunnel; the latter is useful in determining direction. Lay a stick along the line from the fuze or tunnel to the stake above. Measure the azimuth of the stick. This is the approximate azimuth to the mortar.

b. Lay one stick along the ends of the splinter grooves on the side of the crater toward the hostile mortar and place another stick at right angles to the first (fig. 24). Measure azimuth of the second stick.

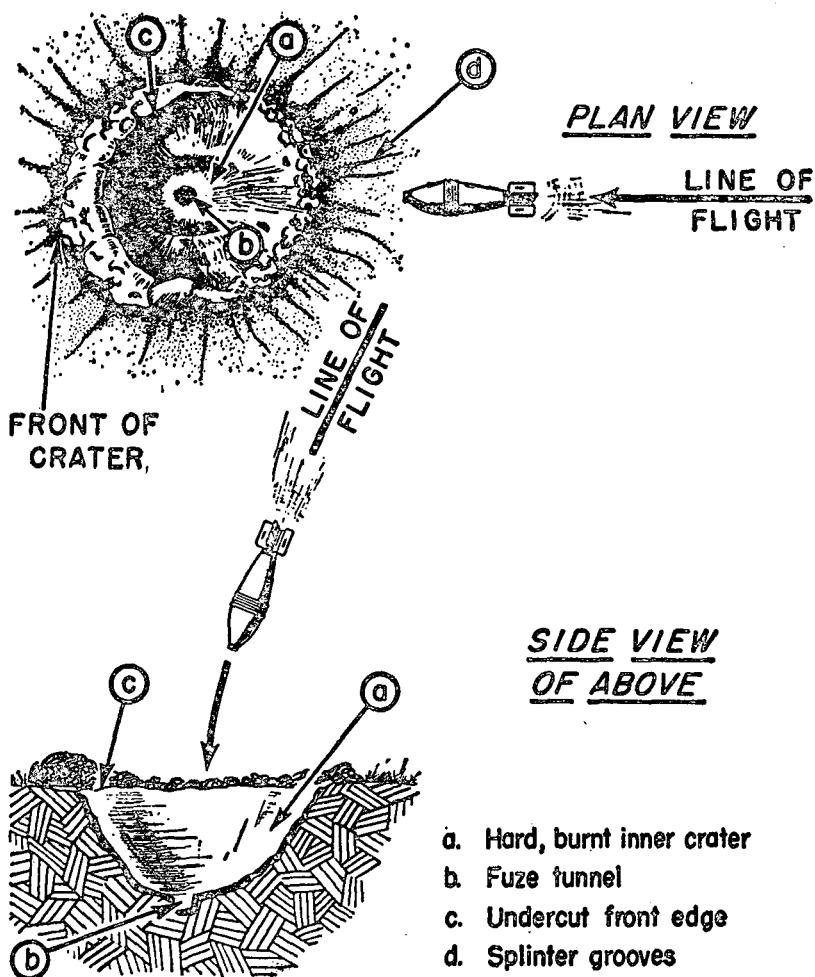


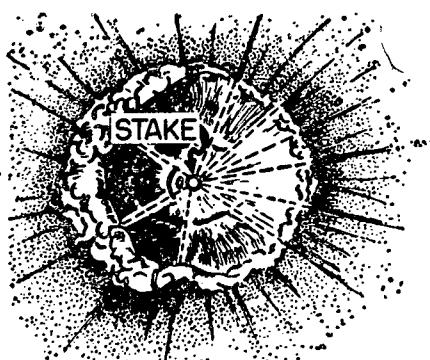
Figure 23. Schematic mortar crater.

c. When a definite and regular crater is formed, a stick can be laid across it along the main axis, that is, dividing the crater into symmetrical halves. The direction of a stick so laid points in the direction of the mortar (fig. 24).

d. The value of each method described above depends upon the type and conformation of the ground. It usually will be found that direction is best determined by a combination of all methods.

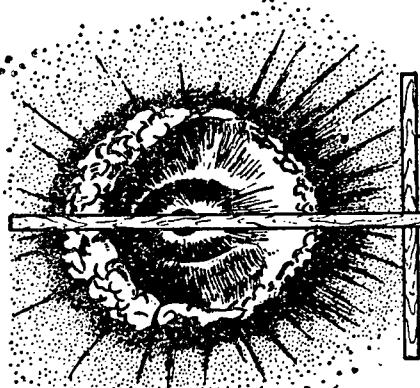
e. Determination of the angle of fall (fig. 25) is a valuable aid in arriving at the range to the hostile weapon. If the fuze hole is deep and well defined, a long, straight stick should be placed in the center

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DIRECTION
TO MORTAR →

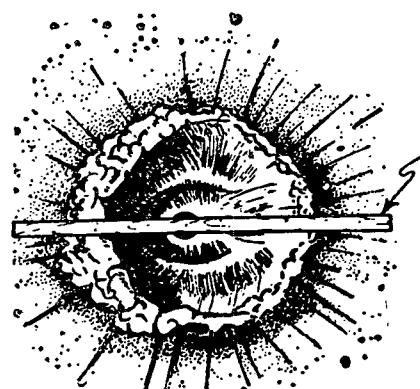
① Locating point of detonation.



DIRECTION
TO MORTAR →

STICKS

② Direction from splinter grooves.



DIRECTION
TO MORTAR →

③ Direction from general shape.

Figure 24. Determination of the line of flight from a mortar crater.

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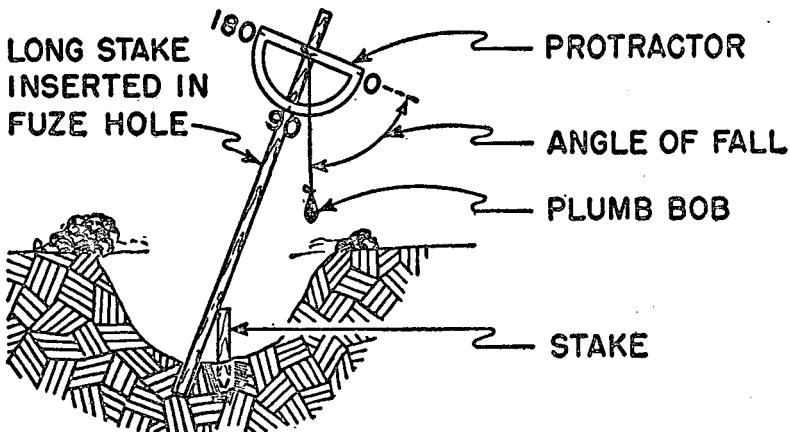


Figure 25. Determining angle of fall from a mortar crater.

of the fuze tunnel to reconstruct the terminal portion of the trajectory of the projectile. With the stick properly placed in the fuze tunnel, a protractor and plumb bob may be used to measure the angle of fall. For more accurate results, the mean angle of fall from a number of craters made by the same weapon should be used.

f. When only one azimuth to the mortar position can be determined, the range to the position may be found from the angle of fall (*e* above) and the type and caliber of weapon as determined from identification of shell fragments and tail fins. In order to use this system, counter-fire personnel must have available to them the firing table of the hostile weapons involved.

CHAPTER 17

COMMUNICATION

292. General

The ability of the artillery to render effective fire support is dependent upon efficient communication. The artillery commander must rely on his communication system in controlling and coordinating the fires of his units. The commander of each echelon of artillery is responsible for the installation, operation, and maintenance of the signal communication system of his command. He is responsible that appropriate personnel of his command are adequately trained in the use of the various means of communication, and that alternate means are available.

293. Means of Communication

Wire, radio, and messengers are the principal means of communication available to the artillery. Other means include visual (pyrotechnics, panels, arm signals, and airplane maneuvers), sound signals, and drop and pickup messages. All available means of communication are utilized. No one means is considered primary and relied upon exclusively. Wire and radio communication are discussed in this manual; for a discussion of other means see FM 24-5.

294. Communication Discipline

To facilitate handling large volumes of communication traffic, orderly and systematic methods must be used. Brevity and correct procedure are necessary in both wire and radio communication. To obtain the maximum effectiveness of the communication system, it is essential for all personnel to be trained in *communication discipline*.

295. Wire

a. General. During movements and during the initial phase of the occupation of a position, radio is relied upon as the principal means of communication. The installation of a wire system is started as soon as the situation permits. Wire circuits parallel the radio channels and take over the communication loads as they are installed. Wire systems are expanded and improved by the installation of additional locals, duplicate circuits, and lateral lines until the wire net fulfills the communication requirements of the situation.

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b. *Responsibility.* Each artillery commander is responsible for the wire system within his command. The responsibility for the establishment and maintenance of wire circuits is established by the following principles:

(1) Superior to subordinate. The higher or superior unit is responsible for establishing and maintaining communication with the lower or subordinate unit. (When a unit is attached to another unit it comes under the classification of a subordinate unit.)

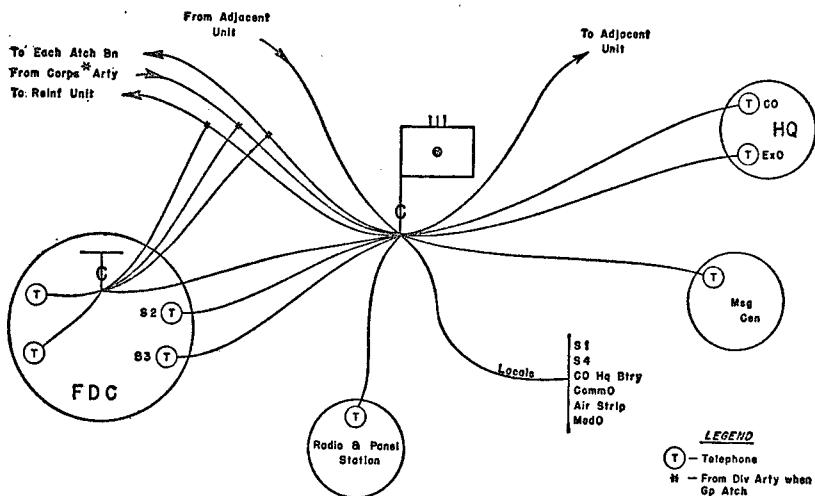


Figure 26. Type wire communications—field artillery group.

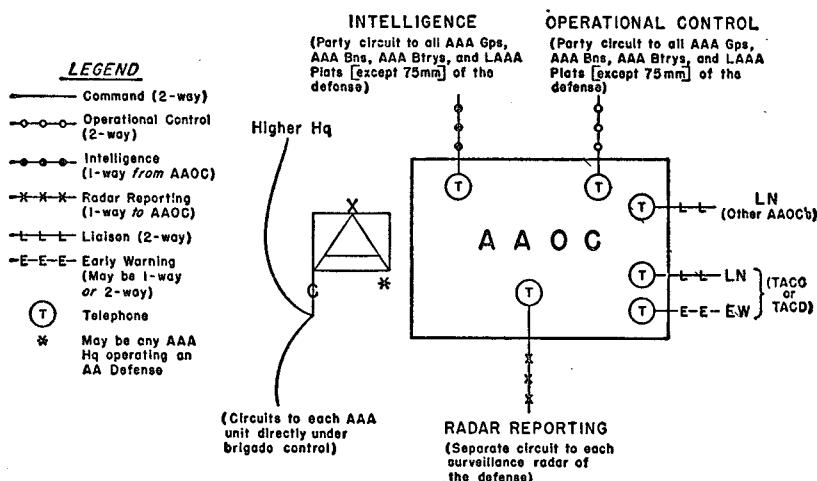


Figure 27. Type wire communications—antiaircraft defense.

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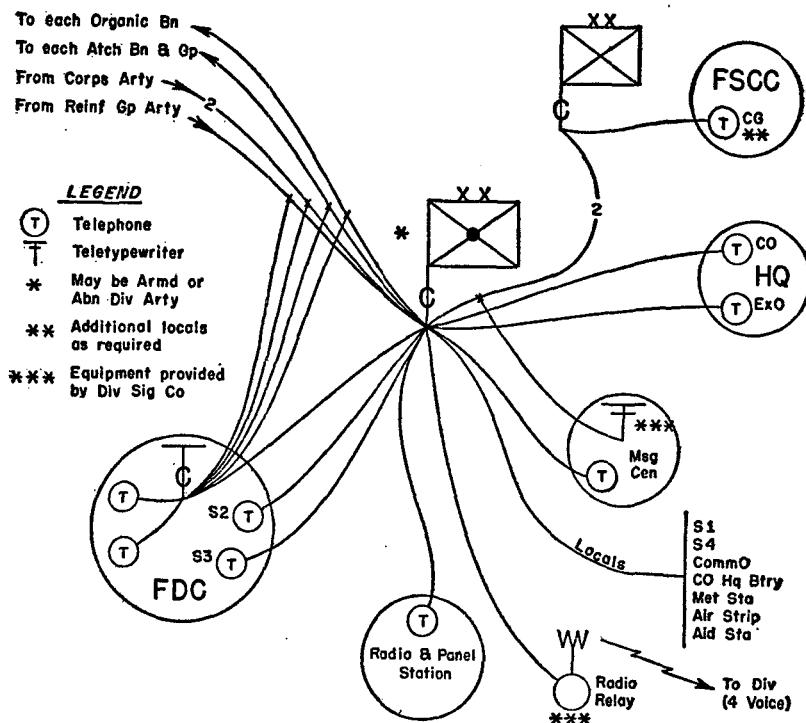


Figure 28. Type wire communications—division artillery.

- (2) Supporting to supported. A unit supporting another unit is responsible for establishing and maintaining communication with the supported unit.
- (3) Reinforcing to reinforced. A unit reinforcing the fires of another unit is responsible for establishing and maintaining communication with the reinforced unit.
- (4) Lateral communication between adjacent units is established and maintained as directed by the next higher common commander. In the absence of specific instruction or SOP, the commander on the left is responsible for establishing and maintaining communication with the unit on his right.
- (5) Although one unit is specifically charged with establishing and maintaining communication with another unit, it is only through the joint effort of all concerned that communication is assured. If communication is lost, its immediate reestablishment is the joint responsibility of all units affected.

c. *Capabilities.* Wire communication—

- (1) Is flexible and reliable and less subject to mechanical and electrical failure than radio.
- (2) Requires a somewhat lower degree of technical skill to install, operate, and maintain than does radio communication.
- (3) Is less easily intercepted than is radio or visual communication.

d. *Limitations.* Wire communication—

- (1) Requires considerable time, labor, material, and equipment to install, operate, and maintain.
- (2) Is subject to failure because of the vulnerability of long lines to bombing, artillery fire, enemy patrols, and damage by vehicles.
- (3) Is subject to mechanical and electrical failure in proportion to the complexity of the equipment involved.
- (4) Is subject to tapping.

e. *Systems.* For type wire communications employed in field artillery groups, AA defense, division artillery, and corps artillery, see figures 26 to 29, respectively.

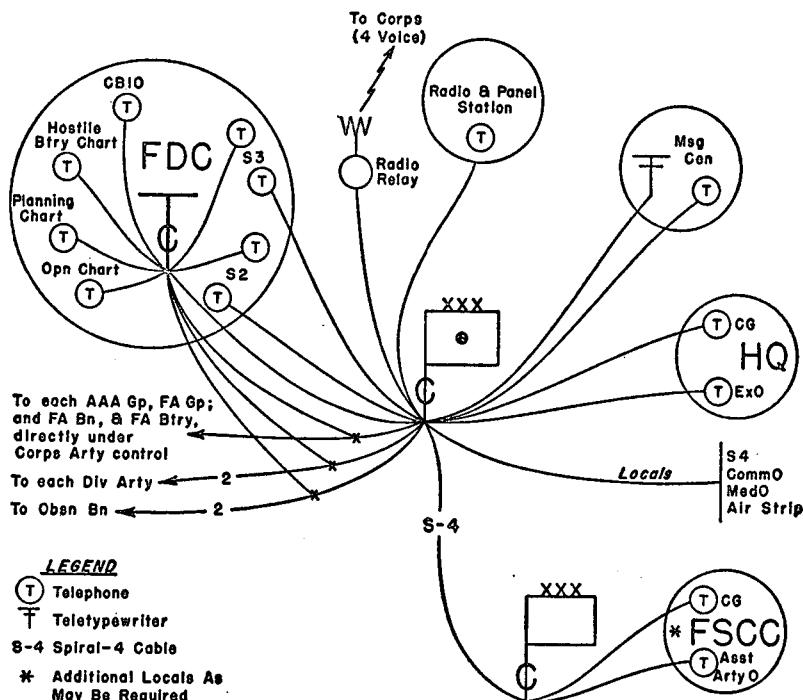


Figure 29. Type wire communications—corps artillery.

296. Radio

a. General. Radio is an essential means of communication for highly mobile elements. It is especially suitable for motor movements, during displacements, and in fast moving situations. It supplements wire communication and replaces it in the event of the latter's failure.

b. Capabilities.

- (1) Radio sets are readily portable, may be placed in operation quickly, and may be operated from moving vehicles and aircraft.
- (2) No physical circuits are required to establish communication.
- (3) Radio is a readily available means of long-range communication.

c. Limitations.

- (1) Radio equipment is complex and fragile. It requires constant maintenance and intelligence care.
- (2) Operating and maintenance personnel require extensive specialized individual training.
- (3) Radio messages are easily intercepted by the enemy. Necessary cryptography and authentication delay transmissions.
- (4) Radio is subject to enemy jamming and affords the enemy a means of locating radio transmitters and thereby command posts and other installations.

d. Systems. For type radio communications in field artillery groups, AA defense, division artillery, and corps artillery, see figures 30 to 33 respectively.

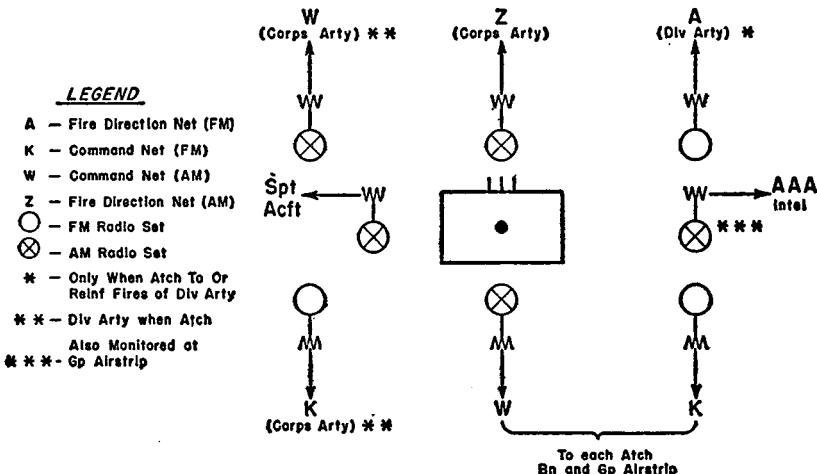


Figure 30. Type radio communications—field artillery group.

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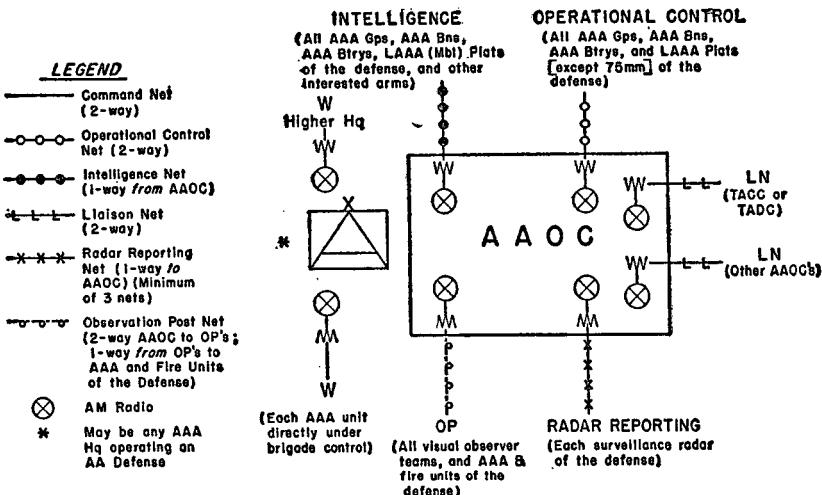


Figure 31. Type radio communications—antiaircraft defense.

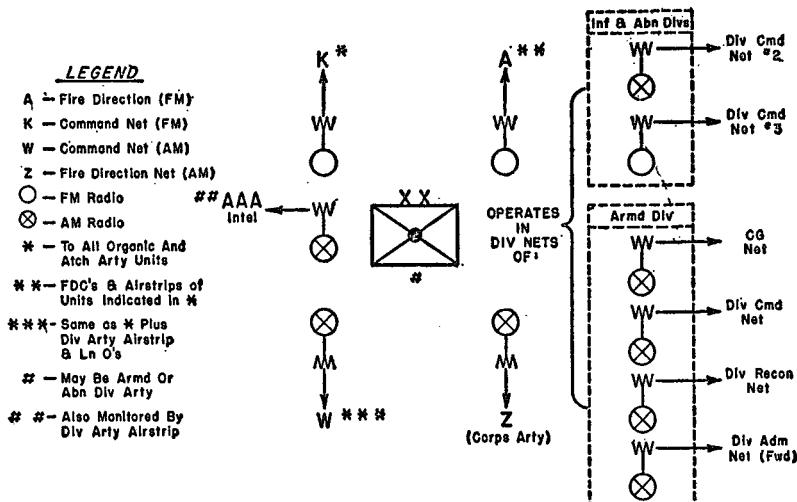


Figure 32. Type radio communications—division artillery.

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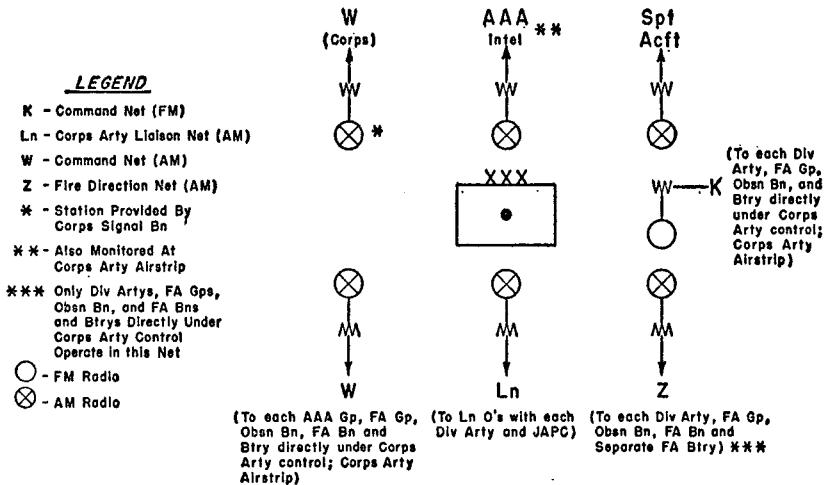


Figure 33. Type radio communications—corps artillery.

297. Signal Operation Instructions and Standing Signal Instructions

a. Signal operation instructions (SOI) are a series of standing orders issued periodically for the technical control and coordination of signal communication within a command. They include items covering codes and ciphers, radio call signs and frequencies, a telephone directory, and visual and sound signals. Current items are listed in the index to the SOI. The SOI are prepared by the signal officer and conform to the SOI of the next higher unit. Normally units smaller than a division do not prepare their own SOI, instead they issue extracts of the division SOI. When authorized by higher headquarters, they prepare brevity codes, operation codes, map codes, and prearranged message codes.

b. Standing signal instructions (SSI) prepared by the signal officer, may be issued in a separate publication or under the same cover with the SOI, SSI include items of operational data not subject to frequent change and instructions for the use of the SOI.

CHAPTER 18

AMMUNITION SUPPLY

298. General

The effectiveness of an ammunition supply system is measured by its ability to place the required amount of the proper type of serviceable ammunition in the hands of the using troops when needed. Class V supplies have a direct influence on tactical operations and are therefore controlled by all commanders in the tactical chain of command. The ammunition supply system is designed to permit the replacement of quantities expended in the most expeditious manner and with the minimum of formality. The ammunition supply system known as "the continuous refill system" is based on possession of ammunition by the using units of a fixed basic load of ammunition which will be replenished as used (FM 6-101, FM 9-6, FM 100-10, and FM 101-10).

299. Maintenance of the Basic Load

a. All commanders must insure that units maintain their basic loads at the prescribed level. Failure to observe this requirement will cause an unanticipated depletion of reserves of ammunition within the army since ammunition issued initially or for replenishment of the basic load is considered as ammunition expended and is not included in the theater supply level. Hoarding above the basic load may impair mobility of units, cause ammunition to be abandoned, and in aggravated cases, deny commanders the opportunity to exploit tactical opportunities because of maldistribution.

b. Units arriving in the theater of operations less basic loads of ammunition may draw ammunition at any designated supply installation by presenting a transportation order bearing the statement, "INITIAL ISSUE QUANTITIES ARE WITHIN AUTHORIZED ALLOWANCES."

c. Units replenish their basic loads and draw ammunition for immediate consumption from designated ammunition supply points upon presentation of a transportation order bearing the statement, "REQUIRED TO REPLENISH BASIC LOAD (REQUIRED FOR IMMEDIATE CONSUMPTION). EXPENDITURES ARE WITHIN AUTHORIZED AVAILABLE SUPPLY RATE." The statement, "Required for Immediate Consumption," will be inter-

preted to mean that ammunition will be expended within 24 hours subsequent to withdrawal from the ammunition supply point. Replenishment of the basic load in an active situation may be made concurrent with, in anticipation of, or after expenditures. For example, an infantry division preparing to defend against an enemy attack may stockpile ammunition at gun positions and draw ammunition from the ammunition supply point on the basis that it is required for immediate consumption.

d. The exact quantity of ammunition in the possession of a unit may temporarily exceed the basic load. A unit drawing ammunition on the basis that it is required for immediate consumption is in effect drawing ammunition in anticipation of a requirement. This temporary overage may be frequent and normal during sustained fighting. However, when it occurs, it will not be reported as an overage unless the overage is excessive and is held by the unit for a period in excess of 24 hours. Unit commanders must prevent temporary overages from becoming excessive or prolonged. For example, an artillery battalion commander has an available supply rate of 100 rounds per weapon per day and he estimates that he will require this much ammunition within the next 24 hours. Accordingly the 100 rounds per weapon is drawn "for immediate consumption." However, his unit only expends 75 rounds per weapon and he therefore has an excess of 25 rounds. The commander estimates that he will require 75 rounds per weapon for the next 24 hours' firing, and although his available supply rate is 100 rounds, he draws only 50 rounds per weapon "for immediate consumption" thereby eliminating his overage and at the same time assuring himself of an adequate supply of ammunition for immediate consumption.

300. Exceptional Situations

Occasionally, it may be necessary for a unit to obtain and *hold* ammunition in excess of its basic load. An example is an artillery unit supporting a force in a passage across a terrain obstacle. Under such circumstances, army authorizes the transfer of a specific quantity of ammunition from the army tactical reserve to the appropriate unit. This authorization permits the unit to exceed its basic load for a stated period of time. The quantity of this authorized excess ammunition on hand is reported daily so that an accounting of the army tactical reserve may be made. These reports may be made to the army ammunition officer through regular command channels, or to the supply installation supporting the unit. The unit commander hold-

ing this authorized excess ammunition has the same responsibility for conserving, safeguarding, and *displacing* it as he has for his own basic load.

301. Antiaircraft Artillery

When antiaircraft artillery is in an air defense mission the expenditure of ammunition will be directly proportional to the extent of enemy aerial activities in the area. Therefore, antiaircraft artillery units must forecast their ammunition requirements on a broad basis with respect to the time and area. Control of expenditure of antiaircraft ammunition may be maintained by limiting the number of rounds per weapon per target. No restriction should be imposed as to the number of engagements, since antiaircraft artillery fire units should engage all aerial targets which present themselves. When antiaircraft artillery is utilized in surface missions it will usually be bound by the same ammunition restrictions as field artillery. It is the responsibility of commanders to adjust the supply of ammunition so that all units have sufficient ammunition at all times to perform their missions. Such adjustment must be made within the limits of the available supply rate.

302. Administrative Ammunition Reports

The ammunition supply system eliminates the need for administrative ammunition reports from units. Units are not required to report ammunition on hand unless quantities exceed the basic load (pars. 299 and 300). Withdrawals from ammunition supply points by using units provide information on ammunition expenditures. Ammunition supply points are replenished on the basis of withdrawals to maintain a stock level sufficient to supply all units supported by the ammunition supply point. Periodically, units are required to submit through command channels their estimated requirements (required supply rate) for a specified period. These requirements are considered by each command before announcing an *available supply rate* to a subordinate command.

APPENDIX I

REFERENCES

AR 220-5 Designation and Classification of Units.
AR 220-50 Regiments—General Provisions.
AR 220-60 Battalions—General Provisions.
AR 320-50 Authorized Abbreviations.
SR 10-5-1 Organization and Functions, Department of the Army.
SR 110-1-1 Index of Army Motion Pictures, Kinescope Recordings, and Film Strips.
SR 220-150-5 Assignment of Separate Nondivisional Battalions and Companies.
SR 310-20 series Military Publications.
SR 320-5-1 Dictionary of United States Army Terms.
SR 320-50-1 Authorized Abbreviations.
SR 525-45-1 Combat Operations, Command Report.
FM 4-5 Coast Artillery Tactics.
FM 5-15 Field Fortifications.
FM 5-20 series Camouflage.
FM 6-40 Field Artillery Gunnery.
FM 6-101 The Field Artillery Battalion.
FM 6-110 Pack Artillery.
FM 6-120 Field Artillery Observation Battalion and Batteries.
FM 6-135 Adjustment of Artillery Fire by the Combat Soldier.
FM 6-140 The Field Artillery Battery.
FM 7-10 Rifle Company, Infantry Regiment.
FM 7-20 Infantry Battalion.
FM 7-24 Communication in Infantry and Airborne Divisions.
FM 7-25 Headquarters Company, Infantry Regiment.
FM 7-40 Infantry Regiment.
FM 8-10 Medical Service, Theater of Operations.
FM 9-6 Ordnance Ammunition Service in the Field.
FM 17-70 Signal Communication in the Armored Division.
FM 17-100 Armored Division and Combat Command.

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FM 20-100 Army Aviation.
FM 21-5 Military Training.
FM 21-8 Military Training Aids.
FM 21-26 Advanced Map and Aerial Photograph Reading.
FM 21-30 Military Symbols.
FM 22-5 Drill and Ceremonies.
FM 24-5 Signal Communications.
FM 24-16 Signal Orders, Records, and Reports.
FM 24-17 Communication Center Operations.
FM 25-10 Motor Transportation, Operations.
FM 30-5 Combat Intelligence.
FM 31-20 Operations Against Guerrilla Forces.
FM 31-25 Desert Operations.
FM 31-35 Air-Ground Operations.
FM 31-50 Combat in Fortified Areas and Towns.
FM 31-60 River-Crossing Operations.
FM 31-70 Basic Arctic Manual.
FM 31-71 Operations in the Arctic.
FM 31-72 Administration in the Arctic.
FM 44-1 Antiaircraft Artillery Employment.
FM 44-2 Antiaircraft Artillery Automatic Weapons.
FM 44-4 Antiaircraft Artillery Guns.
FM 44-8 Antiaircraft Operations Room and Antiaircraft Artillery Intelligence Service.
FM 57-20 Airborne Techniques for Divisional Units.
FM 57-30 Airborne Operations.
FM 60-5 Amphibious Operations Battalion in Assault Landings.
FM 60-25 Employment of the Amphibious Support Brigade.
FM 60-30 Amphibious Operations; Embarkation and Ship Loading (Unit Loading Officer).
FM 70-10 Mountain Operations.
FM 72-20 Jungle Warfare.
FM 100-5 Field Service Regulations—Operations.
FM 100-10 Field Service Regulations—Administration.
FM 100-11 Field Service Regulations—Signal Communications Doctrine.
FM 100-15 Field Service Regulations—Larger Units.
FM 100-31 (Classified).
FM 101-1 The G1 Manual.
FM 101-5 Staff Organization and Procedure.
FM 101-10 Organization, Technical, and Logistical Data.
FM 110-5 Joint Action Armed Forces.

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TM 6-605 Field Artillery Individual and Unit Training Standards.

TM 9-1901 Artillery Ammunition.

TM 9-1907 Ballistic Data, Performance of Ammunition.

TM 11-462 Signal Corps Tactical Communications Reference Data.

TM 23-200 (Classified.)

TM 30-240 Soviet Projectile Identification Guide.

TM 57-210 Air Movement of Troops and Equipment.

APPENDIX II

FORMS AND EXAMPLES

1. Form for Estimate of the Situation (FM 101-5)

Note.—Although the details considered by the artillery commander in his estimate vary with the level of command and with the fire support means available, the five paragraph sequence remains the same. The estimate is the process by which the artillery commander arrives at his recommendations to the force commander concerning the employment of the available fire support.

CLASSIFICATION

Issuing section and headquarters
Place
Date and time

Charts or maps:

1. MISSION.—The mission is the actuating factor of the estimate. It is a statement expressing a clear concept of the assigned mission, and the mission and plans of the supported unit. The mission is derived either from orders and instructions received from higher authority or by deduction from instructions and a knowledge of the situation. When derived from orders, careful consideration must be given to the wording of these orders to insure that the intent of the superior is clearly understood. When deduced, assurance is necessary that such a mission will contribute to the accomplishment of the superior unit's mission. In planning for possible future operations, the commander and staff consider all logical future missions and prepare as completely as possible estimates and plans for each. This planning requires the artillery commander to continually examine the possible effects of each of these missions upon the requirements for fire support.
2. THE SITUATION AND COURSES OF ACTION.—Paragraph 2 lists the considerations affecting the possible courses of action, the enemy capabilities, and all of the reasonable and practicable friendly courses of action. When assisting as a staff officer in the preparation of the force commander's estimate, the artillery commander is primarily concerned with this paragraph.
 - a. *Considerations affecting the possible courses of action.* These considerations include an examination of the characteristics of the area of operation, the enemy and friendly situations, and such other elements as may be involved. Such factors as the following are considered:
 - (1) Effects upon fire support of the forecasted weather. Influence of the terrain and hydrographic conditions upon fire support.
 - (3) Late intelligence with emphasis on enemy fire support weapons.
 - (4) Target summary.

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- (5) Information concerning recent enemy activities.
- (6) Capabilities of the available fire support which may include: artillery calibers, types, ranges, and ammunition availability; communication facilities; aircraft types, numbers, armament, and periods available; and availability of naval armament by caliber, range, and ammunition.
- (7) Present artillery dispositions, organization for combat, status of supply and combat efficiency.
- (8) Availability of reinforcements in the form of additional fire support.

b. *Enemy capabilities.*—Once the elements of the situation and their effects have been considered, the capabilities of the enemy to affect the accomplishment of the assigned mission can be deduced.

c. *Own courses of action.*—Subparagraph 2c considers all practicable courses of action that, if successful, will result in accomplishment of the mission. Courses of action that are obviously illogical or that will not result in accomplishing the mission are not considered. In the preparation of the force commander's estimate, the artillery commander must evaluate each possible course of action proposed and determine whether the available fire support is adequate or whether additional support is required. He carefully analyzes the requirements for fire support, considering the capabilities and limitations inherent to the available weapons, the status of artillery supply and maintenance, the effects of the area's characteristics, the enemy capabilities and known targets. From this analysis he derives specific fire support requirements for each course of action. Ammunition requirements, road priorities, signal support and other factors influencing the effectiveness of fire support are also clearly outlined by the artillery commander for each course of action considered. The artillery commander's analysis of requirements for fire support may indicate that some otherwise feasible courses of action become illogical.

3. ANALYSIS OF OPPOSING COURSES OF ACTION.—Each of our own practicable courses of action is examined in the light of each of the enemy capabilities. The advantages and disadvantages of each line of action with respect to the enemy are determined from this examination.

4. COMPARISON OF OWN COURSES OF ACTION.—The advantages and disadvantages of each of our own possible courses of action are weighed one against another and that course of action appearing to offer the greatest prospect of success is selected. If several courses offer equal prospects of success, the one that most favors future action is chosen.

5. DECISION.—The selected course of action is translated into a concise conclusion which the artillery commander submits to the force or next higher commander as a recommendation for the employment of the fire support with the force. So much of the *who, what, when, where, how, and why* are included as is appropriate.

(Signature)

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2. Form for Operation Plan and Operation Order

(FM 101-5)

Note.—The form for the operation plan and the form for the operation order are identical except for the changes noted below.

CLASSIFICATION

Issuing headquarters
Place of issue
Date and time

Operation Plan (Order) _____
(Serial number or title)

Charts or maps:

Task organization: List here, when appropriate, the task subdivisions or tactical components which will comprise the command, together with the names and ranks of the commanders.

1. GENERAL SITUATION.—Such information of the general overall situation as may be essential for subordinates to understand the current situation. The situation may be shown on overlays.

a. *Enemy forces.*—Composition, disposition, location, movements, estimated strengths, identifications, and capabilities.

b. *Friendly forces.*—Pertinent information of own forces other than those listed in the Task Organization that may have a bearing on the decision of a subordinate. General information concerning the plans of the supported unit, next higher unit, and supporting forces, such as available naval gunfire and tactical air support, is included.

c. *Assumptions (operation plan only).*—Assumptions used by the commander as a basis for this plan. Normally applicable only to higher planning echelons.

2. MISSION.—A statement of the task which is to be accomplished by the commander and its purpose. Usually this paragraph is divided into *a*, the mission, and *b*, the details of coordination. Paragraph 2*a* is always written out, even on an overlay type operation order. Paragraph 2*b* may contain or refer to the commander's concept of the operation. When it is desired to include the concept, it is usually subdivided into a maneuver subparagraph and a fire support subparagraph. When paragraph 2*b* contains the commander's concept of operation, the details of coordination and control measures applicable to the command as a whole are placed in 2*c*. Many of these details may be shown on an operation map or overlay, in which case they need not be written out in paragraph 2. When the concept of operation is not stated, paragraph 2*c* becomes 2*b*.

3. TASKS FOR SUBORDINATE UNITS.—In separate lettered subparagraphs, give the *specific* tasks of each element of the command charged with the execution of tactical duties. The organization for combat and attachment of units appears in this paragraph. The artillery subparagraph in the force operation order follows the subparagraphs pertaining to the maneuver elements and contains as a minimum the artillery organization for combat and a reference to the fire support plan.

a. In subparagraph *x*, instructions applicable to two or more units or elements or to the entire command are given. Such instructions are necessary either for coordination or for the general conduct of the operation. If the plan (order) is not effective upon receipt, the time at which, or conditions under which, it is to be placed in effect is stated.

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4. ADMINISTRATIVE AND LOGISTICAL MATTERS.—Broad instructions concerning administration and logistics for the conduct of the operation. Such items as rates of supply and location of supply points are listed here. Instructions of this type are frequently included in an annex, administrative order, or SOP, in which case appropriate reference is made.
5. COMMAND AND SIGNAL MATTERS.—Plan of communications (may refer to a standard plan or be contained in an annex), zone time to be used, rendezvous, location of commander and command posts, statement of command relationship, and axis of signal communication as appropriate.

Annexes

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Authentication

CLASSIFICATION

3. Sample Division Artillery Operation Order

CLASSIFICATION

1st Inf Div Arty

OpnO 14

241400 Jan _____

Maps: -----

1. a. 1st Inf Div Periodic Intel Rept No. 18.
b. Anx A, Opn overlay.
2. Div Arty spt atk with 30-minute preparation beginning 260530 Jan.
3. a. 1st FA Bn: DS 1st Inf.
b. 2d FA Bn: GS.
c. 3d FA Bn: DS 3d Inf.
d. 4th FA Bn: GS; establish comm with and answer calls for fire from 3d FA Bn to one-fourth aval sup rate.
e. 1st AAA AW Bn (SP): Provide air def in Pri, Div Arty, Div Res.
z. (1) Psn: Anx A, Opn overlay.
(2) Firing chart: Map -----.
(3) SIC: -----.
(4) Register one wpn per bn prior to 252300 Jan.
(5) Preparation: Anx B, Fire Plan.
4. a. Div AdminO 8.
b. ASP 6 -----.
c. DAO: RJ ----- open 251100 Jan.
d. Aval sup rate: 105-mm How—100.
155-mm How—80.
5. a. Div SOI, Index 2.
b. CP: Anx A, Opn overlay. Bn select and rept loc.

BY COMMAND OF BRIGADIER GENERAL OVERHILL

DALE
ExO

Anx: A—Opn overlay (omitted)

B—Fire Plan (omitted)

Distr: B

OFFICIAL:

(s) Beaver

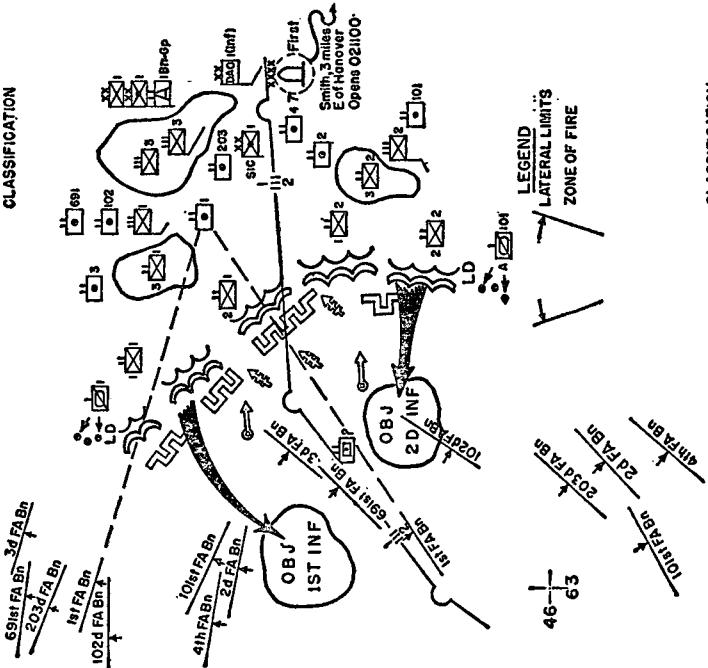
S3

CLASSIFICATION

Security Information

70

4. SAMPLE DIVISION ARTILLERY OPERATION ORDER (OVERLAY TYPE)



1st Inf Div Art
Grove School 6831 PA
020315 MAY

MONO 20
Type: PENNSYLVANIA, 1125,000, Sp1 Map 6.

- a. Overlay.
- b. Div ask this afternoon; time later.
- c. Div arty opt atk with 60 minute preparation beginning H-60.
- d. 1st FA Bn IS 1st Inf.
- e. 2d FA Bns IS 2d Inf.
- f. 3d FA Bns IS GS.
- g. 4th FA Bns GS.
- h. 101st FA Bn Paint tires 2d FA Bn.
- i. 102d FA Bn Paint fires 1st FA Bn.
- j. 203d FA Bn Paint fires 1st FA Bn.
- k. 491st FA Bn US.
- l. 1st AAA AW Hq-Dpt. Christian AAA AW Bn Cmdg.
- m. 1st AAA AW Bn En (SP)
- n. 901st AAA AW Bn (SP)
- o. Provide air def in P.R.
- p. Div Artj, Div Ens.
- q. Firing Chart: Sp1 Map 6, 1125,000
- r. Div Admin 10.
- s. Index 3, Div SOT. FOR
Brig Gen
- t. Later: A 101st FA Bn
102d FA Bn
203d FA Bn
691st FA Bn
901st AAA AW Bn (SP)
- u. OFFICIAL;
v. Jones
SS

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5. Suggested Form for Fire Support Plan Annex to Force Operation Order

CLASSIFICATION

Headquarters
Place
Date and time

Annex _____ (Fire Spt Plan) to OpnO _____

Charts or maps:

1. GENERAL SITUATION.—Such information of the general situation as may be essential for amplifying the fire support aspects of the current situation.
 - a. *Enemy forces.*—Reference may be made to the operation order's intelligence annex, a target summary appendix, periodic intelligence reports, and other media for disseminating information of the enemy. Late information and intelligence of concern to the fire support means, not published elsewhere, may be included.
 - b. *Friendly forces.*—Pertinent information of own forces and of those friendly agencies that are available for fire support but are not under the command of the force (supported unit) commander. Separate subparagraphs are used for each force or agency.
2. MISSION.—This paragraph outlines the mission of the fire support means available to the command and may outline the extent of availability of fire support.
3. SPECIFIC INFORMATION AND INSTRUCTIONS.—Separate subparagraphs give specific information, missions, and instructions concerning the available fire support agencies. *Information* is provided for those fire support agencies not under the command of the supported unit (force) commander. *Missions or instructions* are given those fire support agencies under the command or operational control of the force (supported unit) commander. As much pertinent information and instructions as are *known* by the FSCC are included to facilitate planning by subordinate echelons.
 - a. Information and instructions concerning two or more fire support agencies are contained in subparagraph a. Material necessary for implementing and facilitating fire support coordination is contained here.
4. ADMINISTRATIVE AND LOGISTICAL MATTERS.—Broad instructions concerning administration and logistics pertaining to the fire support for the operation. Included are such items as available supply rates and instructions for maintenance of equipment with, but not under the control of the force.
5. COMMAND AND SIGNAL MATTERS.—Signal instructions, times effective, location of FSCC's, and other appropriate command and signal matters.

Signature

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6. Suggested Form for Target Analysis

Note.—The specific target analysis form for the tactical use of atomic weapons is indicated in other appropriate classified training publications.

1. SITUATION AND COURSES OF ACTION.

~~SECURITY INFORMATION~~

- a. *Situation of opposing forces.*
 - (1) *Enemy situation.*—Contains so much as will aid in the analysis of the target.
 - (2) *Friendly situation.*—Same as (1) above.
- b. *Target characteristics.*
 - (1) *Target description.*—Description of the target to include type (personnel, materiel, terrain features), numbers of personnel and quantity of materiel, activity.
 - (2) *Vulnerability.*—Type and amount of cover, type of materiel, type of construction, mobility, density of personnel and materiel.
 - (3) *Physical location and altitude.*—Grid reference and altitude of target; location with respect to supported unit and terrain features; proximity to friendly troops.
 - (4) *Accuracy of location.*—Give estimated accuracy of target location.
 - (5) *Size and shape of target area.*—Give the dimensions and shape of the target area; distribution of personnel and materiel within the area.
 - (6) *Terrain and weather.*—Brief analysis of weather and terrain in the target area; include any terrain features that affect means and methods of attack.
- c. *Target capabilities.*—A discussion of the capabilities of the target as they affect the accomplishment of the mission of the supported unit; if a terrain feature(s) show how it affects enemy capabilities.
- d. *Other factors.*—List and discuss all or any of the following factors, or any additional ones that will affect the choice of fire power, delivery means, and method of attack.
 - (1) *Urgency of attack.*—Usually determined by the type of target (static or fleeting) and by target capabilities.
 - (2) *Enemy countermeasures.*—Ability of the enemy to minimize effects of fire power; consider capability of the enemy to prevent effective delivery and to bring countermeasures against delivery means after attack.
 - (3) *Enemy discipline and morale.*—This factor will aid in the determination of amount of fire power required to neutralize personnel targets.
 - (4) *Creation of obstacles.*—Discuss any considerations concerning desirability or undesirability of creating obstacles by attacking the target.
 - (5) *Civilian casualties.*—Show approximate number of civilians in the target area and any special implications involved in causing excessive casualties.
 - (6) *Surprise.*—Discuss any particular methods desired to obtain surprise, including least expected time of attack, means of delivery, restrictions on registration.
- e. *Means of attack.*—Note here all available types of fire power and required amounts with which it would be practicable to attack the target; show most practicable delivery means in each case.

2. ANALYSIS OF MEANS OF ATTACK.—Discuss each of the means of attack in their application to the target characteristics (par. 1b), target capabilities (par. 1c), and other factors (par. 1d). Include in the discussion the following for each means of attack:

- a. *Location of center of impact.*—That which will obtain greatest effect; include optimum height of burst.
- b. *Availability.*—Discuss available supply rates and effect on future use.
- c. *Estimate of enemy casualties and materiel damage.*

~~SECURITY INFORMATION~~

- d. Estimate of civilian casualties.*
- e. Estimate of obstacles created.*
- f. Precautions required for friendly troops.*

Note.—The analysis of each of the means of attack may be shown in an annex.

3. COMPARISON OF MEANS OF ATTACK.—Summarize the outstanding advantages and disadvantages of each means of attack and decide which offers the most promise of success.
4. DECISION OR RECOMMENDATION.—
 - a. Type and amount of fire power and delivery means.*
 - b. Unit(s) to fire.*
 - c. Grid reference and altitude of desired center of impact; height of burst.*
 - d. Time of attack.*
 - e. Safety precautions, special coordination, and warnings required.*
 - f. Method for determining post attack analysis.*

7. Suggested Form for Corps or Division Artillery Intelligence Bulletin

CLASSIFICATION

Issuing section and headquarters
Place
Time and date

Artillery Intelligence Bulletin No. ____

1. GENERAL. Front-line progress, latest locations, and friendly activities of particular interest to artillery echelons are discussed in this paragraph.
2. ENEMY SITUATION.
 - a. Artillery.* Hostile artillery dispositions, composition, and strength may be presented by referring to changes which have taken place since the last bulletin. The composition of the several identified groups is discussed briefly along with the activity indicated by such sources as sound and flash, observed missions, and shelling report azimuths. Newly occupied or suspected areas are mentioned to focus observation into these areas.
 - b. Infantry.* Any information of interest, such as new locations, extracted from bulletins of higher headquarters, G2 reports, and from own sources.
 - c. Armor.* Similar to paragraph *b* above.
 - d. Air.* Any change in enemy air capabilities.
 - e. Other elements.* Similar to paragraph *b* above.
3. ENEMY OPERATIONS.
 - a. Artillery.* Essentially a general review of the time, place, and quantity of shelling received in the areas occupied by division and corps troops, with specific reference to fire placed on friendly artillery. Mention is made of the noteworthy changes in the quantity of enemy shelling, to include comparison of the day and night volume, increase or decrease of the caliber of shells employed, new areas attacked and old target areas abandoned, and type of targets receiving special attention.
 - b. Infantry.* Any information of interest, such as counterattacks, extracted from bulletins of higher headquarters, G2 reports, and from own sources.
 - c. Armor.* Similar to paragraph *b* above.
 - d. Air.* Résumé of enemy air activities.
 - e. Other elements.* Similar to paragraph *b* above.
4. MISCELLANEOUS
 - a.* A statement of the weather conditions is published daily.

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- b. A brief review including effect of outstanding fire missions is given, giving credit to units firing.
- c. Information, as necessary, is given regarding maps and photographs.
- d. Descriptions of new developments in the technical and tactical aspects of the hostile artillery and which are of definite interest to all echelons of artillery are given.

5. TARGET LOCATIONS.

- a. *Hostile battery (mortar) locations.* Additions and deletions to the current hostile battery (mortar) list.
- b. *General target locations.* Additions and deletions to the current general target list.

Signature

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8. Suggested Form for Army or Theater Army Artillery Information Bulletin

CLASSIFICATION

Headquarters
Place
Time and date

Artillery Information Bulletin No. _____

TABLE OF CONTENTS. The title of each article, paragraph number, page number, and security classification is listed.

INTRODUCTION. Any pertinent remarks desired by the artillery officer.

Section I. ARTILLERY PERSONNEL AND ORGANIZATION

Articles concerning personnel and organization are included in this section, for example—

1. New arrivals in the artillery.
2. Lists of staff members and commanders of artillery units.
3. Changes in tables of organization and equipment.
4. Any other personnel or organizational information.

Section II. OPERATIONAL PROCEDURE

Examples of appropriate articles are—

1. Any changes in artillery doctrine.
2. Uses of various types of photographs.
3. Employment of field artillery searchlights.
4. Lessons learned in previous campaigns.
5. Various methods of attack of targets as learned by experience.
6. Meteorological data.
7. Sun azimuth tables.
8. Successful improvisations.
9. Other articles of operational interest.

Section III. INTELLIGENCE

Articles of intelligence activities such as—

1. Notes on prisoner of war interrogation.
2. Enemy measures against friendly methods of attack.
3. Enemy methods of fire.

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~~Report Security Information~~

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4. Enemy tactical ruses.
5. Comparison of hostile and friendly artillery methods, equipment, etc.
6. Enemy organization.
7. Enemy counterintelligence measures.
8. Other articles of an intelligence nature.

Section IV. MATERIEL, SUPPLY, AND EQUIPMENT

The following are examples of such articles:

1. Test firing against enemy materiel.
2. Characteristics of new weapons and fuzes.
3. Comparative armor penetration for various weapons.
4. Ammunition expenditures.
5. Other articles of interest pertaining to materiel and ammunition.

Section V. MISCELLANEOUS ARTICLES OF GENERAL INTEREST

Examples of these articles are—

1. Extracts of lessons learned in other theaters.
2. Operations of particular units.
3. Other articles of general interest.

Note.—Any charts, photographs, or illustrations desired or necessary for proper understanding of any articles are included.

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9. Suggested Form for Artillery Periodic Intelligence Report

CLASSIFICATION

Issuing Unit:

Place:

Date and Hour of Issue:

PERIODIC INTELLIGENCE REPORT NO. _____

Period covered: (From) (To)

Maps: (Those needed for an understanding of the report.)

1. ENEMY SITUATION AT END OF PERIOD.

- a. *Enemy front line (or nearest elements).* Location and nature.
- b. *Organization of position.* Trenches, emplacements, observation posts, command posts, obstacles, etc.
- c. *Artillery, mortars, and rockets.* (Care must be observed to state in this paragraph circumstances regarding the hostile artillery that are essentially true and are not unwarranted assumptions.)
 - (1) New locations and calibers, including newly occupied or suspected areas.
 - (2) Estimated combat efficiency (strength, degree of training, morale, and other pertinent factors).
 - (3) Composition, including designations of units, is discussed briefly including the source of information as sound and flash ranging, observed missions, and reports of shelling. (May be submitted as an annex to the report.)

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- d. *Other targets.* Any other targets located, for example:
 - (1) Reserves and other forces.
 - (2) Supply establishments and routes, bridges, and by-passes.
- 2. ENEMY OPERATIONS DURING PERIOD.
 - a. *General summary.* Artillery action of enemy forces as a whole.
 - b. *Artillery operations.*
 - (1) Reports of shelling to include the time, place, and quantity of shelling received in the areas occupied by division and corps troops, with specific reference to counterbattery fire placed on friendly artillery. Mention is made of the noteworthy changes in the quantity of hostile shelling, to include comparison of the day and night volume, increase or decrease of the caliber shells employed, new areas attacked and old target areas abandoned, and type of targets receiving special attention.
 - (2) Shifts in hostile artillery areas.
 - (3) Other pertinent actions.
 - c. *Operation of component elements.* (Derived from artillery sources.)
 - (1) Antiaircraft artillery.
 - (2) Armor.
 - (3) Aviation.
 - (4) Engineers.
 - (5) Infantry.
 - (6) Guided missiles or long-range rockets.
 - (7) Other elements.
 - d. *Miscellaneous.* Such enemy activities, movements, or changes since last report as are not conveniently included in b and c above.
- 3. OTHER INTELLIGENCE FACTORS.
 - a. Estimated enemy casualties caused by artillery fire and prisoners captured by the artillery.
 - b. Morale.
 - c. Terrain.
 - d. Supply and equipment.
 - e. Enemy's probable knowledge of our artillery situation—observation (evidence of employment of sound and flash ranging), reconnaissance, prisoners and documents lost by us, civilians, etc.
 - f. Enemy counterintelligence measures. (Use of concealment, smoke, radio and radar jamming, deception, ruses, etc.)
 - g. Weather, visibility, and meteorological conditions.
 - h. Any enemy intelligence not specifically covered by headings of this report.
- 4. COUNTERINTELLIGENCE. Brief resume of counterintelligence situation derived from artillery sources.
 - a. Espionage.
 - b. Sabotage.
 - c. Propaganda and rumors.
 - d. Miscellaneous.
- 5. ENEMY CAPABILITIES. (This paragraph is particularly applicable to the S2 of corps artillery.) A discussion of each of the lines of action open to the enemy that may interfere with the accomplishment of our artillery mission. In order to assist the G2, the discussion of lines of action open to the enemy artillery should include the capabilities of delivery of fire on all components of the force. For each enemy capability the effect of time,

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~~Securing information~~

CLASSIFICATION

terrain, general position areas of hostile artillery, ammunition supply, and other factors in the situation would be evaluated. The earliest estimated time at which the enemy can put each into effect should be stated. When applicable, the possible result of the adoption by the enemy of any capability should be included.

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Distr:

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10. Sample Target Summary

Note.—The following suggested form for the target summary is divided into two parts: section 1, a hostile battery (mortar) list and section 2, a general target list. By omitting section 2, the form can be published as a hostile battery list. If desired, the recommended priority for each target may be given.

CLASSIFICATION

S2 section, Hq I Corps Arty
FT SILL, OKLA
20 Jan 1953

TARGET SUMMARY NO. 8

This summary supersedes all previous target summaries and hostile battery lists published by this headquarters.

1. HOSTILE BATTERY LIST.

a. Confirmed.

Grid Square	Name or Conc. No.	Grid Reference	All	Accuracy	Description	Source
3489	CAC	34928948	300	50	1 railway gun	PI, SR
3697	CDC	36909732	400	100	1 ?	SR
3698	CFC	36249862	350	50	4 How, probably 105-mm, 200 yd front, in line, facing SW, well dug-in	PI, FR
3799	CGC	37089920	250	50	4 Hv AA	PI, TA
3892	BBC	38769222	350	100	2 ?	SR
4391	BMC	43989196	400	50	4 Lt	FO, 1st FA Bn
4396	CVC	43349670	300	50	1 Gun, probably 155-mm, facing SE, dug-in	PI, Z
4489	CPC	44588910	95	100	2 Hv	FR
4490	BQC	44189014	295	10	3 M How	PI, Z
4495	BXC	44709508	285	50	3 Lt	OP, 5th FA Bn
4496	CLC	44069628	185	100	6 Lt	RR; AOP, 4th FA Bn

b. Suspect.

3696	CU	36919692	----	200	4 M	TA
3798	CY	37389830	----	250	3 ?	PW
4390	CM	43669068	----	150	2 ?	SR
4489	CR	44328966	----	300	3 SP	Civ rept
4590	DA	45659055	----	50	Dummy (4 guns)	PI

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2. GENERAL TARGET LIST

a. Confirmed.

Grid Square	Name or Conc. No.	Grid Reference	All	Accuracy	Description	Source
3490	E22	34129060	320	100	CP	TA, PI
3696	AB100	36109686	240	50	Air strip	AOP, 2d FA Bn
3699	E37	36829908	300	100	Class III dump, 200 yd long, facing E	PW, PI, Civ rept
4490	E41	44229060	300	100	Veh park, in trees, 100 yd radius	FR, PI
4489	AC125	44308946	90	50	WSP, Veh Actv	FO, 3d FA Bn, FR

b. Suspect.

4391	AD66	43229138		100	Possible assy area, in trees considerable	AOP, 4th FA Bn, TA actv
4495	E98	44909520		100	1 Slt	FR, PW
4391	E101	43089128		50	OP	PI, PW

J. J. BLACK

S2.

DISTRIBUTION:

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11. A Sample Artillery Annex to a Corps Standing Operating Procedure

Note.—The SOP is published in the form that is most effective for the command. Regardless of form, the SOP is published by authority of the commander and carries the same weight as orders and instructions. Although an SOP is based on the several field manuals, it does not repeat material specifically treated in the manuals.

CLASSIFICATION

I CORPS
FT SILL, OKLA
2 Jan 1953

Annex B (I Corps Arty SOP) to SOP, I Corps

Section I. GENERAL

- Reference.* SOP I Corps.
- Applicability.* Arty with I Corps.
- Purpose.* This SOP standardizes normal procedures; it applies unless otherwise prescribed.
- Unit procedure.* Sub units issue SOP to conform.
- Definitions.*
 - Field artillery.* All units asgn an FA tac msn.
 - Antiaircraft artillery.* All AAA units asgn msn air def.
 - All available artillery.* All FA except that engaged in firing a close spt msn.
 - Close support mission.* A fire msn rqst by or dlvry for a unit on tgt that may immediately affect the spt unit. Arty firing such a msn may or may not have a DS tac msn.

Section II. PERSONNEL AND ADMINISTRATION

(As a matter of convenience for subordinate units corps artillery might list extracts from corps SOP relative to replacements, decorations, awards, leaves, promotions, reports, morale activities, and other pertinent subjects.)

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Section III. INTELLIGENCE

6. *Observation.* O-O line prescribed when appropriate by corps arty.

a. *Ground OP.*

- (1) Initially, min of one per corps FA bn.
- (2) Area of responsibility: initially, same as ZF.

b. *Air* (par. 16).

7. *Condition of air raid warning.* As announced by AF (par. 17).

8. *Reports.*

a. *Visibility.*

- (1) Rept of vis will indicate:
 - (a) Loc of OP.
 - (b) Primary area of responsibility.
 - (c) Other designated areas of responsibility.
 - (d) Dead space.
 - (e) Area within limits of eff obsn.
- (2) Submission.
 - (a) From all OP by tp or rad immediately fol occupancy.
 - (b) Fol init rept by vis diagram as soon as practicable.

b. *Shelling report.*

- (1) By most xpd means, fol the standard form, as soon as possible after beginning of hostile shelling.
- (2) Fwd fragments by most xpd means.
- (3) Rept and fragments through arty channels to corps arty.
- (4) Areas of responsibility as established in corps SOP.

c. *Tactical atomic weapon.* (*Extracted from Corps SOP for emphasis.*)

- (1) By fastest practicable means info indicating en cpbl of tac employment of atomic wpn;
 - (a) Withdrawal of en front-line units.
 - (b) Sety det protecting mvmt of mat.
 - (c) Loc of en wpn cpbl of dlvr atomic missiles, projectiles, or bombs.
 - (d) En tng in atomic warfare.
- (2) Rpt RadA detected immediately and later by isointensity chart.

Section IV. OPERATIONS

9. *Fire capabilities.*

a. *Division artillery.*

- (1) Rept to corps arty immediately grid reference and azimuth of cen of ZF of all M btry.
- (2) Rept grid reference of cen of each L bn and azimuth of cen of ZF.
- (3) When practicable, fol init rept with fire cpbl overlay indicating:
 - (a) Grid reference of each M btry and cen of each L bn.
 - (b) Min and max range of each M btry and each L bn.
 - (c) Lateral limits of each M btry and each L bn.
 - (d) Areas in which specific units cannot fire.

b. *Corps artillery battalions.*

- (1) Rept immediately through arty channels to corps arty grid reference and azimuth of cen of ZF each btry.
- (2) When practicable fol init rept with fire cpbl overlay indicating for each btry the info in a(3) above.

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10. Concentration designation.

a. A ltr prefix system of designating conc will be employed as fol:

(1) The first ltr of the conc designation indicates the unit:

Unit	Pref/x
1st Inf Div.....	A
2d Inf Div.....	B
3d Inf Div.....	C
4th Armd Div.....	D
Corps Arty FDC.....	EE

Atch units as designated by corps arty.

(2) A second ltr will be asgn within the div arty and FA gp, for example:

Unit	Pref/x
1st Inf Div.....	A
1st FA Bn.....	AA
2d FA Bn.....	AB
3d FA Bn.....	AC
4th FA Bn.....	AD
1st Inf Div Arty.....	AE

Atch units as designated by div arty.

b. The system for designating a gp of fires will be the same as that used for conc except that the number will be placed between the ltr. For example, the first gp of fires numbered by the 1st FA Bn will be designated A1A.

c. Series of fires and programs of fires will be designated by code names.

d. En btry and mort will be named as described in FM 6-20.

11. Location of supported units.

a. Corps artillery.

(1) DS bn. Rept immediately to next higher hq all changes in loc of spt unit including planned and actual ptl activity.

(2) All bn and arty hq. Rept to next higher hq changes observed.

(3) Corps arty army AvnO. Rept to corps arty changes observed.

b. Division artillery. Disseminate all changes in loc of spt unit, including planned and actual ptl activity, to corps arty, sub, and aja units.

c. No-fire line (NFL).

(1) DS bn.

(a) A NFL will be designated by each DS bn in coord with spt unit.

(b) Changes to NFL will be rept immediately to next higher arty hq.

(2) All arty bn and arty hq obtain clr from appropriate DS bn or div arty prior to firing short of NFL.

(3) Corps arty and div arty coord NFL as required and disseminate loc and changes to superior, sub, and aja units.

12. Fire missions.

a. When practicable, a firing chart based on tgt area and connection surv will be employed by all FA units.

b. Execution.

(1) When an arty hq rec more than one fire msn simultaneously, fire will be dlvd upon that tgt or tgts considered to be most important.

(2) Normally a close spt msn will be given pri.

(3) Unless otherwise engaged arty bn will respond to appropriate rqst for fire from spt units regardless of tac msn.

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c. Emergency massed fires.

- (1) Rqst over corps arty "Z" net (par. 30) inserting after "Fire Msn" the code word for such fires.
- (2) Corps arty will publish periodically a code word for emerg massed fires.
- (3) All avail arty bn will execute this msn if it is within their cpbl.
- (4) Bn will rept execution of msn to next higher hq.
- (5) Bn one volley will be fired in atk of this type tgt unless otherwise specified.

13. Fire planning.

a. General. The corps arty fire plan will be based upon:

- (1) The Corps Fire Spt Plan.
- (2) The announced policies of the corps cmdr.

b. Coordination. Fire plans will be fwd to next higher arty hq for coord. Coord will be effected throughout opn as rqmt occurs and will be conducted by the most xpd means. When time does not permit coord, fires will not be delayed.

c. Preparation of fire plan. Detailed instr for fire planning will be contained in the Fire Spt Plan Anx to the Corps OpnO.

14. Security.

a. Gp coord scy of sub units.

b. Gp and sep arty bn plans will provide for protection and scy of bn and btry perimeters, march colm and convoys.

15. Registration.

a. As soon as possible unless otherwise dir.

b. Corps arty bn rept loc of registration pt and time of registration to corps arty FDC.

c. Prep will be made for high-burst registration.

16. Corps artillery Army aviation.

a. Airfield.

(1) Acft of corps arty bn will be sta at afld designated by unit cmdr.

(2) When unit afld are impractical common afld will be established by gp and corps arty.

b. Operation.

(1) Regardless of whether a common or unit afld is used, unit cmdr will retain opn control of unit acft.

(2) Corps arty will submit a scd for acft surveillance to each gp when cont surveillance is nec.

(3) A gp reinf a div will furnish acft to div as required.

(4) The acft of a reinforcing bn will participate in the scd of the reinforced unit.

(5) Admin and courier msn as scd by corps arty.

c. Communication.

(1) Acft of arty bn will normally operate on organic cmd channel; channels of secondary interest are cmd channels of reinf unit, gp, or corps arty.

(2) FA gp: acft will operate on gp cmd channel; channels of secondary interest are reinf unit cmd or corps arty cmd as directed.

(3) Warning of hostile acft received over AAA intel net will be rebroadcast over appropriate nets to acft in flight.

17. Antiaircraft artillery.

a. Rules for engagement: AAA units SOP will reflect theater cmdrs decision.

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- b. Condition of air raid warning: The AF is responsible for determining the condition of air raid warning which will be announced to the corps AAOC. The condition of air raid warning is indicated by a color code name:
 - (1) Red—air atk imminent.
 - (2) Yellow—air atk probable.
 - (3) White—all clear.
- c. AAA conditions of readiness:
 - (1) *Battle stations.* Minimum personnel required to deliver continuous effective fire. Equipment ready for immediate operation.
 - (2) *Stand by.*
 - (a) Light AAA—Minimum personnel ready to assume battle sta and equipment operational within 30 sec.*
 - (b) Medium AAA—Fire control equipment 100 percent operational; minimum personnel to assume battle sta within 2 min.*
 - (3) *All clear.*
 - (a) Light AAA—Minimum personnel ready to assume battle sta and equipment operational within 2 min.*
 - (b) Medium AAA—Minimum personnel ready to assume battle sta and equipment operational within 5 min.* Fire control equipment and power plant must be warmed up periodically.
- d. AAA action status: (Temporary restrictions; e. g., *hold fire*; will be imposed only when essential to the combined effectiveness of the defense, for the minimum length of time, and to the least possible degree.)
 - (1) *Guns free:* Fire at any aircraft not identified as friendly. This is the normal action status in a GDA.
 - (2) *Gun tight:* Fire only at hostile aircraft.
 - (3) *Hold fire:* Do not fire or cease fire. Hold fire normally should not be made applicable to an entire defense, but rather should apply only to specific aircraft, sectors, altitudes, or corridors. It may be given by the antiaircraft opn officer (AAOO) on duty at the antiaircraft operations center (AAOC).
- e. The AAOO at the AAOC will report to corps arty hq all changes in the condition of readiness.
- f. All or part of an AAA bn may be able to augment FA fires from AA psn. Under such conditions it may be desired that the AAA unit fire surface missions during a specific period such as a prep; in which case, it must be cpbl of reverting to an air def msn on short notice.
 - (1) AAA unit immediately establishes ln with the arty unit whose fires it is ordered to augment and furnishes fire cpbl.
 - (2) The AAA unit establishes wire and rad comm as dir.
- 18. *Observation battalion.*
 - a. The atch obsn bn will establish an SIC in the vic of the corps arty FDC.
 - b. Sub units coord surv plans with SIC.
 - c. Sd of met msg will be announced by corps arty.
- 19. *Field artillery searchlight battery.* See par. ____ corps SOP.
 - a. Employment of slt illumination as dir by corps cmdr.
 - b. Battlefield illumination by slt will be coord by S2 corps arty.

*Times shown may be varied by the AADC based on the extent and efficiency of the warning systems.

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20. Fire support coordination.

Note.—Inasmuch as fire support coordination is of interest to units other than the artillery, this paragraph is properly a part of the corps SOP. It is included in the artillery annex for emphasis.

a. References FM 6-20.

b. Safety procedures.

(1) Bomb safety line.

(a) Fwd bomb safety line loc to corps FSCC for approval by corps cmdr.
(b) Corps coord as required and fwd to JOC.

(2) When ordered, one of the plans given below will be placed in effect or a flak suppression program may be directed.

(a) Code words. Corps SOI.

(b) PLAN WILLIAM. No trajectory will cross or come within a specified dis either side of a line defined by two grid references. The dis either side of the defined line will be 500 yd unless otherwise specified in the transmission of the plan. For example, "Execute Plan William, target area 5135 to 5237 (time) 1020 to 1040." Upon the receipt of this order all fire will be suspended over this area (500 yd either side of a line from grid reference 5135 to grid reference 5237), from 1020 to 1040 hr. If a wider area is required, the order may be "Execute Plan William, target area 5135 to 5237, distance 1,000 yards, 1020 to 1040."

(c) PLAN VICTOR. No trajectory will pass over or into an area defined by a circle with an ordinate over 1,100 feet. The radius of this circle will be 2,500 yd unless otherwise specified. This plan may be used when planes come no lower than 1,500 ft. The order to implement this plan is similar to (b) above, for example: "Execute Plan Victor target area 5133, 1020 to 1040."

(d) PLAN NEGAT. No trajectory, other than small arms, will pass over or into an area defined by a circle of a stipulated radius. The radius of this circle will be 2,500 yd unless otherwise specified. This plan may be used when planes operate at very low alt. It is the same as Plan Victor except the ordinate of the spt fire is not considered. All fire is suspended. The size of the area may be changed by specifying a radius if different from 2,500 yd. The order to implement this plan is announced as in (c) above.

c. Planning.

(1) Plans and rqst of sub units are augmented by neutralization and destruction fires considered nec for adequate spt.
(2) Final fire spt plans will provide for atk of tgt without unnecessary duplication of effort and with the best aval wpn.

Section V. LOGISTICS

21. General. Conform to par. ____, LOGISTICS, SOP I Corps.

22. Ammunition. Corps arty inform sub units of avail sup rate.

23. Evacuation. Units dir to nearest clr sta.

24. Services. Sub units inform corps arty of svc rqst.

25. Maintenance. Conform to par. ____, LOGISTICS, SOP I Corps.

26. Calibration procedure for heavy artillery. See par. ____, LOGISTICS, SOP I Corps.

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27. *Reports.*

- a. Rept ammo in excess of basic load every 24 hrs as of 2400 on AGO Form No. 581 (SR 700-310-1).
- b. Equip shortage rept (omitted).
- c. Unit equip status rept (omitted).

Section VI. COMMAND

28. *Command posts.* Rept mvmt and loc to corps arty.

29. *Liaison.*

- a. Corps arty will maint ln with:

- (1) Corps hq.
- (2) Arty hq of the aja corps on the right.
- (3) Each div arty hq with the corps.
- (4) JAPC.
- (5) Sep corps TF.

- b. Div Arty maint ln with arty hq of aja div on right.

- c. FA Gp asgn to reinf the fires of a div arty will maint ln with the hq of the reinf unit.

30. *Communication.*

- a. *General.* Conform to Corps SOI and SSI. All CommO extract info as nec and as auth.

- b. *Radio nets.* As described in FM 6- and FM 44- series (also see d below).

- c. *Wire system.*

- (1) *General.*

- (a) Wire system parallels established rad net.
- (b) Instl of wire at the earliest time to permit transfer of comm load from rad to wire.

- (c) Whenever possible, recon parties will include appropriate wire veh.

- (2) Corps arty instl wire circuits to the fol sub or sup units. One circuit to each is simplexed.

- (a) FA obsn bn. (Includes a duplicate circuit.)

- (b) Div arty. (Includes a duplicate circuit.)

- (c) Gp hq.

- (d) GS bn operating sep.

- (e) DS bn operating under corps arty ctl.

- (3) Pri of instl of trunk circuits by FA gp as fol:

- (a) Bn of the gp.

- (b) Reinf div arty hq.

- (4) *Security.*

- (a) Tp msg of a directive nature are authenticated.

- (b) Evidence of wire cutting or tapping will be rept immediately.

- (5) Wire nets for corps arty units are as described in FM 6- series.

d. *Corps artillery fire direction (Z) net.*

- (1) *General.* The corps arty fire dir (Z) net opr cont.

See SOI for call signs.

- (2) Sub sta in this net do not transmit except as fol:

- (a) Div arty may rqst fire from corps arty.

- (b) When selected bn, gp, or div arty are designated to fire, these sta receipt for msg.

- (c) Div arty and gp receipt for time synchronization broadcasts.

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- (d) Obsn bn transmit met data on this net.
- (e) Sta at corps arty gp, div arty, obsn bn, and selected bn rept into or leaving net.
- (f) Any sta in answering a specific call.
- (g) Any sta may transmit flash AT wng.

(3) Emerg massed fires may be rqst by any opr sta.

- (a) Emerg massed fire msn are rqst using prev designated code words. If selected bn are desired, each bn is designated by call sign in transmitting the msn.
- (b) Procedures for rqst emerg massed fires:
(Net call sign) THIS IS (corps arty call sign) (code word)
FIRE MISSION
GRID REFERENCE , ALTITUDE (designation of tgt)
. VOLLEYS (omit if one bn volley desired).
TOT (WHEN READY)
I SAY AGAIN
Repeat above procedure.
If msn is TOT add at end of second transmission:
WHEN I SAY TIME, IT WILL BE EXACTLY MINUTES
UNTIL TIME ON TARGET 10 SECONDS, 5, 4, 3, 2, 1,
TIME. IT IS EXACTLY MINUTES UNTIL TIME ON
TARGET.
OUT
- (c) If the corps arty approves rqst, it will be rebroadcast. Rebroadcast by corps arty constitutes a check and is the order to fire.
- (d) All bn hearing any rqst for fire will prep data to fire.

Signature

Authentication :

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APPENDIX III

ILLUSTRATIVE EXAMPLE, PLANNING ARTILLERY OPERATIONS AND FIRE SUPPORT

1. Purpose and Scope

The purpose of this appendix is to illustrate the material presented in the text relative to fire support. Methods by which the various instructions and information pertaining to fire support (particularly artillery) may be published are also shown. The example sets forth those aspects of fire planning that are of particular concern to artillery personnel.

2. Situation

a. Aggressor forces landed on the east coast of the US and, after initial success, were contained in a beachhead. First US Army has now concentrated sufficient force to initiate operations designed to eliminate Aggressor's beachhead.

b. Ninth TAF and Naval Task Force 38 are supporting the operations of First Army.

c. I Corps, a part of First US Army, has the mission of driving south, parallel to the coast line, to clear Aggressor from zone. Included in I Corps are three infantry divisions (20th, 50th, and 55th) and one armored (23d) division.

3. Corps Operation Order

a. First Army commander instructs I Corps commander to seize crossing sites over PENN R. This operation is a part of the First Army attack scheduled for 9 Jan 53, with the seizure of JERTSEY-TOWN as the initial army objective.

b. I Corps commander gives his concept of operation to his staff and subordinate (corps artillery and division) commanders on the projected operation giving them his mission and tentative plan. Based on this briefing, warning orders are disseminated within the corps to alert units and initiate planning.

c. The corps staff, including the fire support coordinator, follows the planning processes described in FM 101-5 and after securing the commander's approval, prepares the corps operation order. As a part of the planning process, the corps FSAC obtains allocation of air from JOC to support the commander's tentative plan. The corps artillery

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commander determines that sufficient remunerative targets and adequate amounts of artillery and ammunition are available to warrant a 30 minute preparation, if desired, by the corps commander. He also outlines the artillery organization for combat for inclusion in the operation order.

d. The corps operation order, shown below, is a formalization and extension of the corps commander's concept of operation and fragmentary orders (b above). It gives his staff and subordinate commanders written instructions and information.

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I Corps
OCEAN CITY (1934), NEW JERSEY
061000 Jan 1953

OpnO 11

Map: US, 1:50,000, CAPE MAY, BURGOYNE, CARTHAGE.

1. a. Annex A, Intelligence.

- b. (1) First Army atk, seizes JERSEYTOWN and cont atk to SE.
(2) Ninth TAF spt First Army.
(3) Naval Task Force 38 spt First Army.
(4) Annex B, Opn Overlay.
(5) Annex C, Fire Spt Plan.

2. a. *Mission.* I Corps atk in zone 090515 Jan, 3 div abreast, 50th Inf Div on E, 20th Inf Div in center, and 55th Inf Div on W; 23d Armd Div passes through 20th Inf Div upon seizure Obj 1 and 2, seizes crossing sites over PENN R in zone, prep to cont atk to SE on order.

b. *Concept of operations.*

- (1) *Maneuver.* Successful accomplishment of the corps' mission requires that enemy 2d defensive zone be breached prior to its occupation in strength, rapid movement of the armored division to the PENN R, and the retention of secured crossings. Therefore, the 1st enemy defensive zone must be breached rapidly, the passage of the 23d Armd Div facilitated together with its early relief on the 2d defensive zone, and maximum support at the PENN R provided.

(2) *Supporting fires.*

- (a) Available air support beginning immediately to be used to atk known enemy Class III and V installations. Prior to H-hour emphasis will be shifted to command and communication installations. Immediately after H-hour maximum effort will be directed against estimated enemy division at _____. Thereafter maximum effort to close support and interdiction missions and to column cover in support of 23d Armd Div.

- (b) Preparation not to exceed 30 minutes will be fired; after H-hour priority to assault and reorganization on Obj 1 and 2. Thereafter priority to 23d Armd Div.

(3) *Bdry, phase lines.* Annex B, Opn Overlay.

3. a. 20th Inf Div:

Atch: 505th Armd FA Bn (155-mm How, SP)
601st Engr C Bn

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b. 50th Inf Div:

Atch: 508th Armd FA Bn (155-mm How, SP)
602d Engr C Bn

c. 55th Inf Div:

Atch: 507 Armd FA Bn (155-mm How, SP)
603d Engr C Bn

d. Corps Arty:

- (1) 601st FA Gp: GS; Comm, In, fire to $\frac{1}{4}$ aval sup rate, to 55th Inf Div Arty.
- (2) 602 FA Gp: GS; Comm, In, fire to $\frac{1}{4}$ aval sup rate, to 20th Inf Div Arty; be Prep shift to 23d Armd Div Arty upon commitment 23d Armd Div.
- (3) 604th FA Gp: GS.
- (4) 692d FA GM Bn: GS.
- (5) 693d FA Bn: GS.
- (6) 505th Armd FA Bn: Atch 20th Inf Div.
- (7) 506th Armd FA Bn: Atch 23d Armd Div.
- (8) 507th Armd FA Bn: Atch 55th Inf Div.
- (9) 508th Armd FA Bn: Atch 50th Inf Div.
- (10) 605th AAA Gp: Provide air def Corps Arty.

(11) 606th AAA Gp: Provide air def in priority ASP No. 906. (grid reference—), Class III SupPt (grid reference—); establish AAOC; co-ordinate AAAIS within the corps.

- (12) 1st FA Obsn Bn: GS.
- (13) 1st FA Slt Btry: GS.
- (14) Annex C, Fire Spt Plan.

e. Corps Engr: Annex D, Engr.

f. Corps Res.—23d Armd Div:

Atch: 506th Armd FA Bn.

- (1) Initially corps res in place.
- (2) Div Arty GS; Comm, In, fire to aval sup rate, to 20th Inf Div Arty; revert to normal mission upon commitment of 23d Armd Div.

g. Hourly rept loc of lead elm to this hq; immediate rept passage of phase lines and seizure of obj.

4. Army Admin0 6, Corps Admin0 5.

5. a. Annex E, Sig. Index 1-66, SOI 9 Eff 090001 Jan.

b. CP—Annex B; units rept loc.

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ANNEXES:

- A—Intelligence (omitted)
- B—Opn Overlay (omitted)
- C—Fire Spt Plan
- D—Engr (omitted)
- E—Signal (omitted)

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4. Corps Fire Support Plan

a. Having heard the commander's oral announcement of his concept of operations, the corps artillery commander as fire support coordinator initiated action, through the FSCC, to prepare the fire support plan. The fire support plan is evolved in close coordination with the corps commander and staff to reflect and amplify the commander's concept of operations.

b. The fire support plan is issued as an annex to the corps operation order. It forms the basis for the detailed fire plans of the available fire support means and the divisions' fire support plans. Such appendixes, as are required, to support the fire support plan are issued. These appendixes may include the artillery fire plan, the air support plan, the naval gunfire plan, the atomic fire support plan, a target summary, and other appropriate plans or data relative to fire support. The fire plan appendixes are issued upon completion of the necessary coordination and integration within the FSCC; the issue of the fire support plan annex is not delayed pending preparation, coordination or integration of the appendixes. Appendixes to the fire support plan annex are issued in whatever form is most appropriate.

c. *The corps artillery fire plan is developed simultaneously with subordinate fire plans and is coordinated with them.* The corps artillery fire plan normally shows only those fires planned by the corps artillery headquarters and those fires requested by subordinate units.

d. The naval gunfire and air support plans are prepared in the FSCC (ch. 15) in accordance with the agreements reached between Air, Navy, and Army representatives. *The naval gunfire and air support plans are in no sense orders to the Navy or Air Force, rather they present information to the force.*

e. Appendixes which would be issued to support the corps fire support plan have been omitted from this example: the naval gunfire and air support appendixes are beyond the scope of this manual; the artillery appendixes issued by corps reflect and amplify those issued by the divisions (pars. 6 and 7).

f. The fire support plan annex shown below is issued to accompany the corps operation order.

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I Corps

OCEAN CITY (1934), NEW JERSEY
061000 Jan 1953

Annex C (Fire Support Plan) to OpnO 11

Map: US, 1:50,000, CAPE MAY, BURGOYNE, CARTHAGE.

1. a. (1) Annex A (Intelligence) to OpnO 11.

(2) Enemy air capable of 40 bomber and 150 fighter-bomber sorties per day, in zone of First Army.

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- b. (1) First Army atk, seizes JERSEYTOWN and cont atk to SE.
 - (2) Ninth TAF spt First Army priority to I Corps until JERSEYTOWN is seized.
 - (3) Naval Task Force 38 spt First Army.
2. Fire spt aval to I Corps spt atk. Priority of all fires to 20th Inf Div until passed through by 23d Armd Div; thereafter priority to 23d Armd Div.
 - a. Air Spt: Elements of Ninth TAF spt atk of I Corps.
 - b. Arty Spt: I Corps Arty spt I Corps atk.
 - c. Naval Spt: Fire Spt Gp (TG 38.1) spt I Corps atk with 2 BB, 5 CA, 1 CL, 8 DD from H-1hr to H+6hr.
3. a. Air Spt:
 - (1) General:
 - (a) Effective immediately and until H-1hr all aval air spt concentrates on atk of known en Class III and V supply installations.
 - (b) From H-1hr to H-hr all aval air spt performs armed recon between lines _____ and _____, concentrating on lines of communication and command installations.
 - (c) H to H+15 minutes all aval air spt concentrates on est en div located at _____
 - (d) After H+15 minutes, normal spt with priority to 20th Inf Div; second priority to requests from 55th Inf Div; priority to 23d Armd Div after passage through 20th Inf Div.
 - (2) Allocations:
 - (a) Fighter-bombers (25) on air alert from H to H+1hr over corps zone to be assigned immediate missions as approved by corps FSCC. Thereafter armed reconnaissance flights report to corps FSCC 5 minutes before crossing front lines for priority targets. Armament—mixed load.
 - (b) One squadron of fighter-bombers on ground alert from H+1hr to H+3hr and H+4hr to H+7hr to be assigned immediate missions with priority to I Corps.
 - (c) One squadron of fighter-bombers provide column cover for 23d Armd Div when committed.
 - (d) Fighter-bomber effort aval to Corps for preplanned missions: Two squadrons.
 - Priority of effort:
 - 1—20th Inf Div (23d Armd Div when committed)
 - 2—50th Inf Div
 - 3—55th Inf Div
 - (e) TADP Fox aval for dir of night or bad weather bombing.
- (3) Air Spt Plan.—App 1.

- b. Arty Spt:
- (1) Arty with the corps will spt atk with preparation H-30 minutes to H-hr. 20th Div Arty sed fires 23d Armd Div Arty H-30 minutes to H-hr; 602d FA Gp H-15 minutes to H-hr. 55th Div Arty sed fires 601st FA Gp H-15 minutes to H-hr.
- (2) After H-hr, normal arty fires with first priority to 20th Inf Div; second priority to 55th Inf Div.
- (3) After passage through 20th Inf Div priority of all arty fires to 23d Armd Div.

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(4) Corps heavy and very heavy arty units will have priority of position areas allocated to corps artillery in zone of 50th and 55th Inf Div.

(5) Organization for combat.

(a) 20th Inf Div:
Atch: 505th Armd FA Bn (155-mm How, SP)

(b) 50th Inf Div:
Atch: 508th Armd FA Bn (155-mm How, SP)

(c) 55th Inf Div:
Atch: 507th Armd FA Bn (155-mm How, SP)

(d) 23d Armd Div:
Atch: 506th Armd FA Bn (155-mm How, SP)
Div Arty, GS; Comm, In, fire to aval sup rate to 20th Div Arty; revert to normal mission on commitment of 23d Armd Div.

(e) 601st FA Gp:
612th FA Bn (155-mm How, Towed)
613th FA Bn (155-mm Gun, SP)
614th FA Bn (8-in How, SP)
GS; Comm, In, fire to $\frac{1}{4}$ aval sup rate, to 55th Div Arty. Fire preparation H-30 minutes to H-hr.

(f) 602d FA Gp:
616th FA Bn (8-in How, SP)
617th FA Bn (8-in How, SP)
618th FA Bn (155-mm Gun, SP)
GS; Comm, In, fire to $\frac{1}{4}$ aval sup rate, to 20th Div Arty; shift to reinf 23d Armd Div Arty on commitment of 23d Armd Div. Fire preparation H-30 minutes to H-hr.

(g) 604th FA GP:
624th FA Bn (155-mm Gun, SP)
625th FA Bn (240-mm How)
626th FA Bn (240-mm How)
GS. Fire preparation H-30 minutes to H-hr.

(h) 692d FA GM Bn: GS.

(i) 693d FA Bn (280-mm Gun): GS.

(j) 605th AAA Gp:
651st AAA AW Bn (SP)
652d AAA AW Bn (SP)
653d AAA AW Bn (SP)
Provide air def Corps Arty; under air def opr ctl 606th AAA Gp.

(k) 606th AAA Gp:
654th AAA AW Bn (SP)
661st AAA Gun Bn (90-mm)
662d AAA Gun Bn (90-mm)
607th AAAOD
One bn provide air def ASP No. 908 (grid reference—); one bn provide air def Class III SupPt (grid reference—); exercise air def opr ctl 605th AAA Gp.

(l) 1st FA Obsn Bn: GS.

(m) 1st FA Slt Btry: GS.

(6) Arty fire plan.—App. 2.

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e. Naval Spt:

(1) Allocation of naval gunfire spt:

I Corps—1 BB, 1 DD GS
20th Inf Div—1 BB, 2 CA aval for GS missions
1 CL, 3 DD aval for DS missions
50th Inf Div—3 CA aval for GS missions
4 DD aval for DS missions
23d Armd Div (upon commitment)—1 BB, 2 CA, 1 CL aval for GS missions

(2) Allocation of naval gunfire control personnel:

	SFCP	NGFL Teams	NGF Teams	Air Spot
I Corps-----	-----	-----	-----	1
20th Inf Div-----	9	3	1	3
50th Inf Div-----	9	3	1	4
23d Armd Div-----	6	3	1	-----

(3) Naval gunfire plan.—App 3.

d. Atomic Spt:

- (1) Atomic fire spt aval to Corps upon request to Army.
- (2) Requests for atomic spt must reach this hq—hr in advance of proposed employment.
- (3) SOP I Corps dated 1 Jan 53.
- (4) Report results of post attack analysis of targets to FSCC upon completion of study by fire spt agency.
- (5) Air Spt Plan, Arty Fire Plan, and Naval Gunfire Plan prepared by div to reach corps FSCC by 081200 Jan.
- (6) Target summary.—App 4.
- (7) Psn and fire support areas and zones of fire.—App 5.

4. a. Army AdminO 6, Corps AdminO 5.

b. Aval Sup Rate: 105-mm How—150
155-mm How—100
155-mm Gun—80
8-inch How—60
240-mm How—50
280-mm Gun—25
FA GM—5

5. a. (1) Index 1-66, SOI 9 eff 090001 Jan.

(2) Joint SOI 22-3a eff 081200 Jan.

b. (1) Corps FSCC (grid reference—).
(2) Other FSCC's—rept loc.

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App: 1—Air Spt Plan (to be published later)

2—Arty Fire Plan (to be published later)

3—Naval Gunfire Plan (to be published later)

4—Target Summary (omitted)

5—Psn and Fire Spt Areas and Zones of Fire (omitted)

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5. Division Operation Order

a. The division commanders having received the corps commander's concept of the operation and fragmentary orders (par. 3) in turn issue their concepts and orders to their staffs and their artillery and regimental commanders. The planning process thus begins in the divisions prior to receipt of the corps operation order. By maintaining close liaison with the corps staff, the division staff, including the fire support coordinator, obtain additional pertinent information upon which to base estimates, plans, and orders. Similarly, the subordinate units of the division are kept apprised of developments in the planning.

b. Upon receipt of the corps operation order, final modifications are made in the division plan and the operation order is issued. The order (overlay type) of the 20th Inf Div is shown below.

6. Division Fire Support Plan

a. The division fire support plan is prepared in conjunction with the division plan of operations according to the division commander's tentative plan. Although based on the corps fire support plan, its preparation begins before receipt of the corps fire support plan. Close liaison between the fire support representatives at corps and division FSCC's is maintained to acquaint corps with division requirements and to inform division of corps decisions. Similarly, fire support representatives in subordinate echelon FSCC's maintain contact with representatives in the division FSCC. The division plan of operations and the fire support plan are evolved together so that when the division operation order (par. 5) is issued, the fire support plan annex can accompany it.

b. As at corps, the fire support plan annex is issued with such appendixes as are readily prepared. Those, such as supporting fire plans, which require more time for preparation, are issued later. In this example, the appendix containing position areas and zones of fire for the artillery is issued to accompany the fire support plan. The fire support plan annex and the position areas and zones of fire appendix issued by the 20th Inf Div are shown below.

CLASSIFICATION

20th Inf Div

BRIGANTINE (1913), NEW JERSEY

070830 Jan 53

Annex B (Fire Support Plan) to OpnO 12

Map: US, 1:50,000, CAPE MAY, BURGOYNE, CARTHAGE.

1. a. (1) Annex A (Intel) to OpnO 12.

(2) Enemy air capable of 40 bomber and 150 fighter-bomber sorties per day
in zone of First Army.

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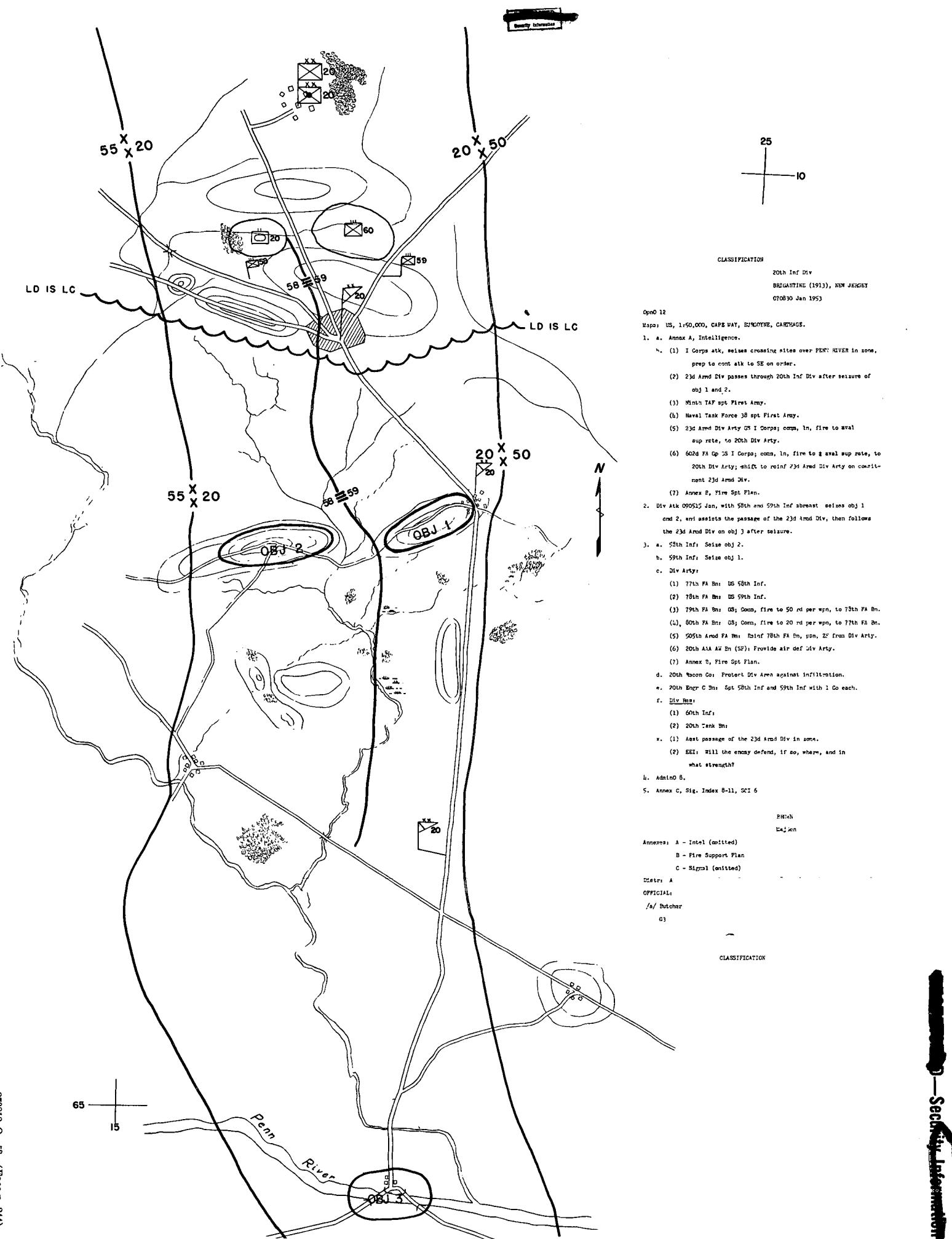


Figure 35.

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b. (1) I Corps atk, seizes crossing sites over PENN R in zone, prep to cont atk to SE on order.

(2) Air spt: Div asgd 1st priority air spt from fighter-bomber squadrons aval to corps for preplanned missions; air support plan.—App. 1.

(3) Arty spt:

(a) 23d Armd Div Arty:

89th Armd FA Bn (105-mm How, SP)
90th Armd FA Bn (105-mm How, SP)
91st Armd FA Bn (105-mm How, SP)
92d Armd FA Bn (155-mm How, SP)

Atch: 506th Armd FA Bn (155-mm How, SP)

GS I Corps; Comm, In, fire to aval sup rate, to 20th Div Arty; revert to normal mission on commitment of 23d Armd Div.

(b) 602d FA Gp:

616th FA Bn (8-in How, SP)
617th FA Bn (8-in How, SP)
618th FA Bn (155-mm Gun, SP)

GS; comm, In, fire to $\frac{1}{4}$ aval sup rate 20th Div Arty; shift to reinf 23rd Armd Div Arty on commitment 23d Armd Div.

(c) Arty fire plan.—App 2.

(4) Naval spt: Div allocated 1 BB, 2 CA for GS missions; 1 CL, 3 DD for DS missions; naval gunfire plan.—App. 3.

2. Fire spt aval to div spt atk. Priority of fires to 59th Inf.

3. a. Air Spt:

(1) One squadron of fighter-bombers on air alert from H-hr to H+1hr over corps zone to be assigned immediate missions as cleared by corps FSCC. Thereafter priority targets will be engaged by armed reconnaissance flights as cleared by corps FSCC.

(2) One squadron of fighter-bombers on ground alert from H+1hr to H+3hr and H+4hr to H+7hr to be assigned immediate missions with priority to I Corps.

(3) Air spt plan.—App 1.

b. Arty Spt:

(1) Arty with the corps will spt atk. Preparation H—30 minutes to H-hr.

(2) Div Arty:

(a) 77th FA Bn: DS 58th Inf. Schedule fires of: 89th Armd FA Bn H—30 minutes to H-hr; 80th FA Bn H—15 minutes to H-hr.

(b) 78th FA Bn: DS 59th Inf. Schedule fires of: 79th FA Bn, 90th Armd FA Bn, and 91st Armd FA Bn H—30 minutes to H-hr; 505th Armd FA Bn H—15 minutes to H-hr.

(c) 79th FA Bn: GS; comm, fire to 50 rds per wpn to 78th FA Bn.

(d) 80th FA Bn: GS; comm, fire to 20 rds per wpn to 77th FA Bn.

(e) 505th Armd FA Bn: Reinf 78th FA Bn; psn, ZF, from Div Arty.

(f) 20th AAA AW Bn (SP): Provide air def Div Arty.

(g) Arty fire plan.—App 2.

(h) Psn areas and zones of fire.—App 4.

(i) CG Div Arty schedule fires of: 92d Armd FA Bn and 506th Armd FA Bn H—30 minutes to H-hr; 602d FA Gp from H—15 minutes to H-hr.

c. Naval Spt:

(1) Allocation of naval gunfire spt:

1 BB: GS

CLASSIFICATION

~~Security Information~~

CLASSIFICATION

- 1 CA : GS, 58th Inf
- 1 CA : Gs, 59th Inf
- 1 CL, 1 DD : DS, bn designated by 59th Inf
- 2 DD : DS, bn designated by 58th Inf

(2) Allocation of naval gunfire control personnel:

	SFCP Teams	NGFL Teams	NGF Teams	Air Spot
20th Inf Div-----	-----	-----	1	
58th Inf-----	3	1	---	1
59th Inf-----	3	1	---	1
60th Inf-----	3	1	---	1

(3) Naval gunfire plan.—App. 3.

4. a. Div AdminO 8.

- b. Aval Sup Rate: 105-mm How—150
- 155-mm How—100
- 155-mm Gun—80
- 8-in How—60

5. a. Index 8, SOI.

- b. (1) Div FSCC (grid reference—).
- (2) Other FSAC's—rept. loc.

BROWN
MajGen

App: 1—Air Spt Plan (to be published later)
 2—Arty Fire Plan (to be published later)
 3—Naval Gunfire Plan (to be published later)
 4—Psn Areas and Zones of Fire

Distr: A

OFFICIAL:

- (s) Butcher
- G3

CLASSIFICATION

7. Division Artillery Fire Plan

a. The artillery fire plan to support the division's operations is prepared by coordinating and consolidating the battalions' direct support fire plans (FM 6-101). Concentrations requested by direct support battalions are scheduled for other artillery available to the division as are targets of particular interest to the division as a whole. Occasionally higher headquarters will have requirements which must be included.

b. In planning the fires for support of the 20th Inf Div attack, concentrations are planned for confirmed and suspect targets, and for the protection of the reorganization following seizure of objectives 1 and 2. In addition, check concentrations, to be used for orientation of observers and troops, are planned. All concentrations plotted on the overlay are listed in the Description of Concentrations. Those to be fired on a time schedule are listed in the schedule of fires. The schedule of fires graphically points out the concentrations to be fired,

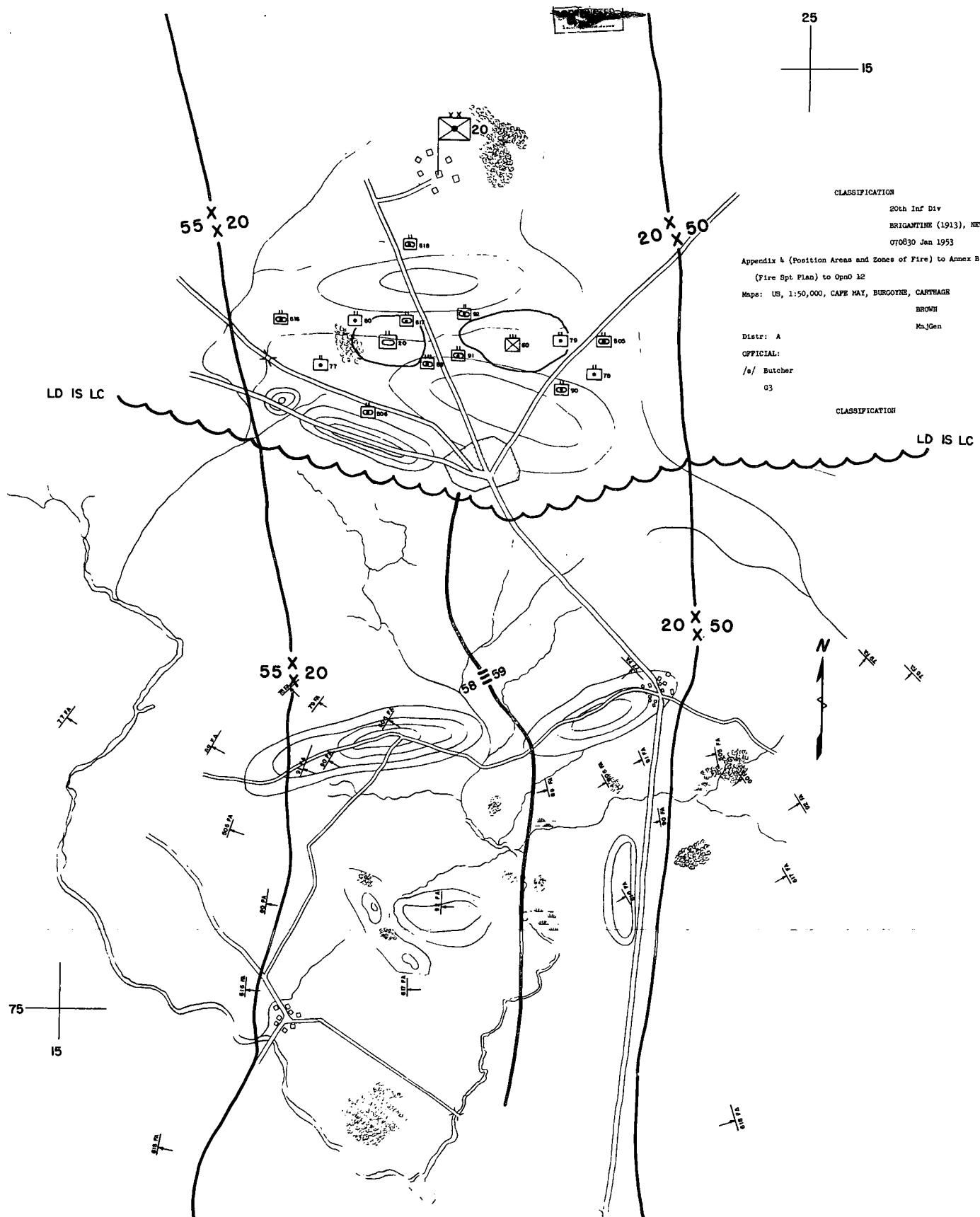


Figure 36.

Note: The operations chart of the 20th Division Artillery as it appears after objectives 1 and 2 have been seized is shown below. Defensive fires have been planned and that in time permits to protect the infantry as they reorganize. Concentrations have been planned and are no longer considered of immediate importance as outlined.

DESCRIPTION OF CONCENTRATIONS					
No.	Description	Grid Reference	Alt (mts)		Remarks
AAB16	Avenues of approach	255699233	125		
AA150	Protective fire	28679754	123		
AA151	" "	28679936	127		
AA152	Avenues of approach	27879754	132		
AA153	" "	28159959	135		
AA154	" "	28559888	138		
AA350	Avenues of approach	28959992	112		
AA351	Protective fire	30569873	106		
AA352	" "	30559840	115		
AB150	Avenues of approach	38550210	139		
AB151	" "	38460254	135		
AB152	" "	38500289	128		

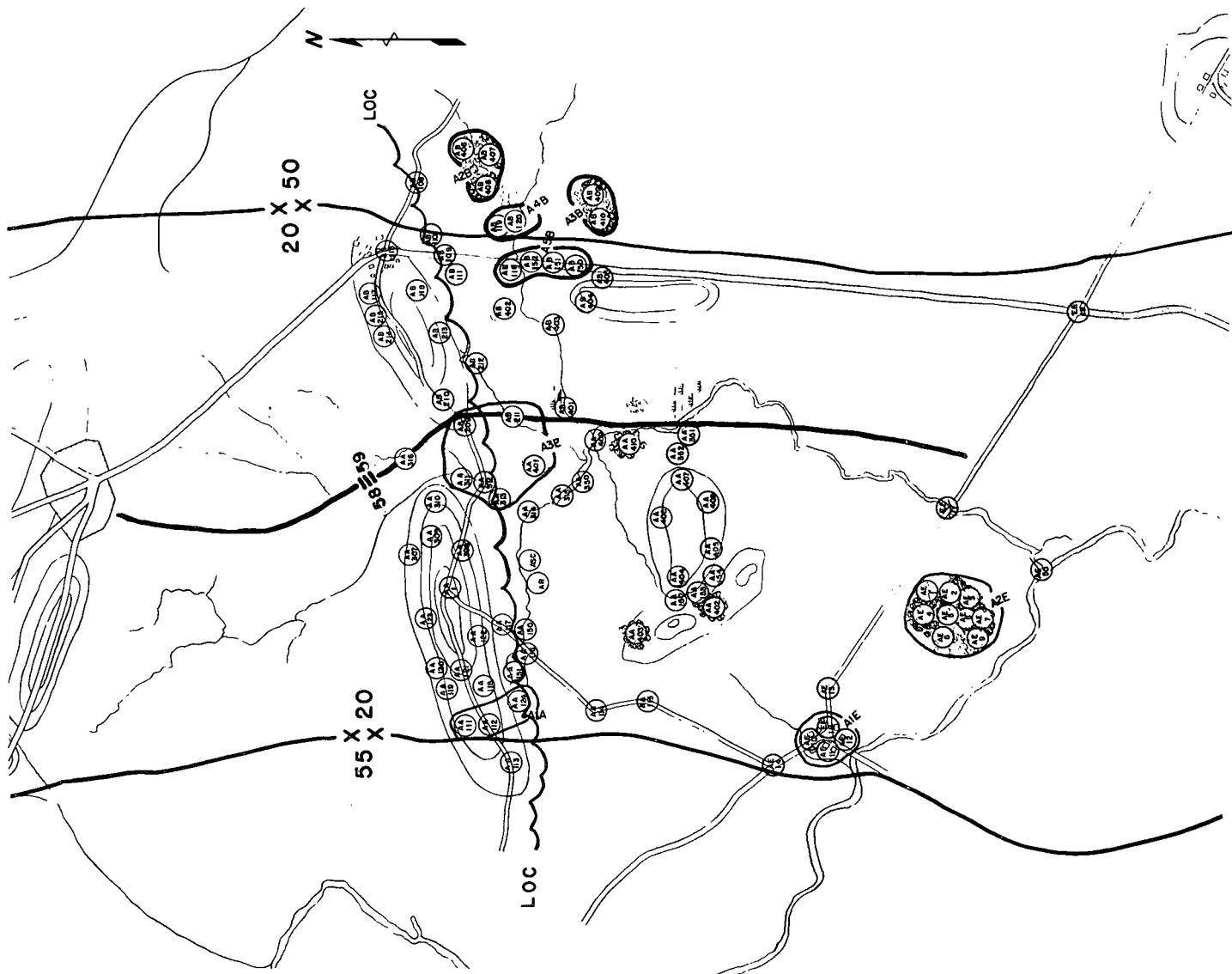


Figure 38.

~~Security Information~~

the units to fire, the time of firing, and the amount of ammunition to be expended on each concentration by the firing unit.

a. When the direct support fire plans have been coordinated, consolidated, augmented, and integrated into a division artillery fire plan, additional required fires are obtained from corps artillery or if not available, adjustments are made in the fire plan. Coordination and integration of the artillery fire plan with the naval gunfire and air support plans is accomplished in the division FSAC and any further adjustments required are made. Subordinate units are notified of changes affecting their fire plans and the artillery fire plan appendix (shown below) to the division fire support plan annex is issued.

8. Continuation of Planning

After the orders for the attack are issued, the planning process continues: late intelligence and new information affecting the operation are evaluated and, if appropriate, modifications are made to the previously issued instructions. Developments on other fronts are examined to determine their possible influence on the forthcoming operation. The planning process continues at all echelons throughout the operation with all foreseeable contingencies considered.

9. The 20th Infantry Division Attack

a. The attack of the 20th Infantry Division moved off according to plans and objectives 1 and 2 were seized. As the infantry reorganizes on these objectives and prepares to continue the attack, the fires planned to protect the reorganization are augmented by additional fires on other possible avenues of approach. Field artillery forward observers and liaison officers plan and coordinate these additional protective concentrations with the supported commanders and other available fire support representatives. Check rounds are fired on certain critical concentrations and any necessary additional fires to support the continuation of the attack are planned.

b. The division artillery operations chart is maintained to reflect the fires previously planned plus those additional concentrations (*a* above) received from the battalions and other sources. Shown below is the 20th Division Artillery operations chart approximately 1 hour after objectives 1 and 2 have been taken.

10. Defensive Fire Planning

a. As the infantry is preparing for the passage of the armored division, Commanding General, 20th Infantry Division receives instructions from I Corps commander to assume the defensive immediately along the present line of contact. He is informed that due to developments in III Corps zone, the remainder of First Army is also assuming

a defensive role. He immediately issues fragmentary orders to subordinate commanders informing them of the change in plans and ordering them to establish a defensive position with limiting points (grid reference _____, _____, _____) so that the MLR passes generally through objectives 1 and 2.

b. The commanders of the 58th and 59th Infantry Regiments and their subordinate battalion commanders initiate necessary readjustments of the temporary defenses which they established upon seizure of objectives 1 and 2. With their staffs and fire support coordinators they confer with the supporting commander of the engineer company to plan for minefields, barbed wire, and other barriers. Recommendations and requests for such changes as boundary adjustments and additional engineer and tank support are forwarded to division.

c. The artillery protective fires (par. 9) already planned are re-examined, augmented, and closely coordinated with infantry fires and defense plans and with engineer barriers. One barrage per battery is allocated in accordance with the regimental commander's desires. The barrages are carefully located and fired-in. Survey is extended to locate accurately the barrages and critical defensive concentrations. Artillery fires are coordinated at each level by the artillery representative (forward observer with the rifle company; liaison officer with the infantry battalion; and direct support artillery commander at regiment) both with the supported units' defense plans and organic fires and with other support available. Fires beyond the capabilities of the direct support battalions are requested from division artillery or reinforcing battalions.

d. Artillery fire plans for the support of a defense ordinarily include more concentrations than do those prepared to support an attack. All avenues of approach must be covered, fires must be planned throughout the depth of the defensive position and fires must be prepared to support counterattack plans.

e. As in planning fires to support an attack, the division artillery fire plan for a defensive situation is a reflection of the direct support fire plans, augmented by fires desired by division. However, defensive artillery fire plans published by corps and division normally show *all* planned concentrations including those of the direct support battalions.

f. The artillery fire plan when completed is coordinated with corps artillery and, at the division FSCC, with the division plan of defense and other fire support plans. It is published as an appendix to the fire support annex which accompanies the new division operation order. The 20th Division Artillery Fire Plan Appendix shown below was prepared as described above.

20th Inf Div

BASIC PLANE (1913) NEW JERSEY

092300 Jan 1953

Appendix I (Artillery Fire Plan) to Annex C
(Fire Opt Plan) to Opno 13

Map: US, 1:50,000, CAF MAP, BURGOM, CARTHAGE

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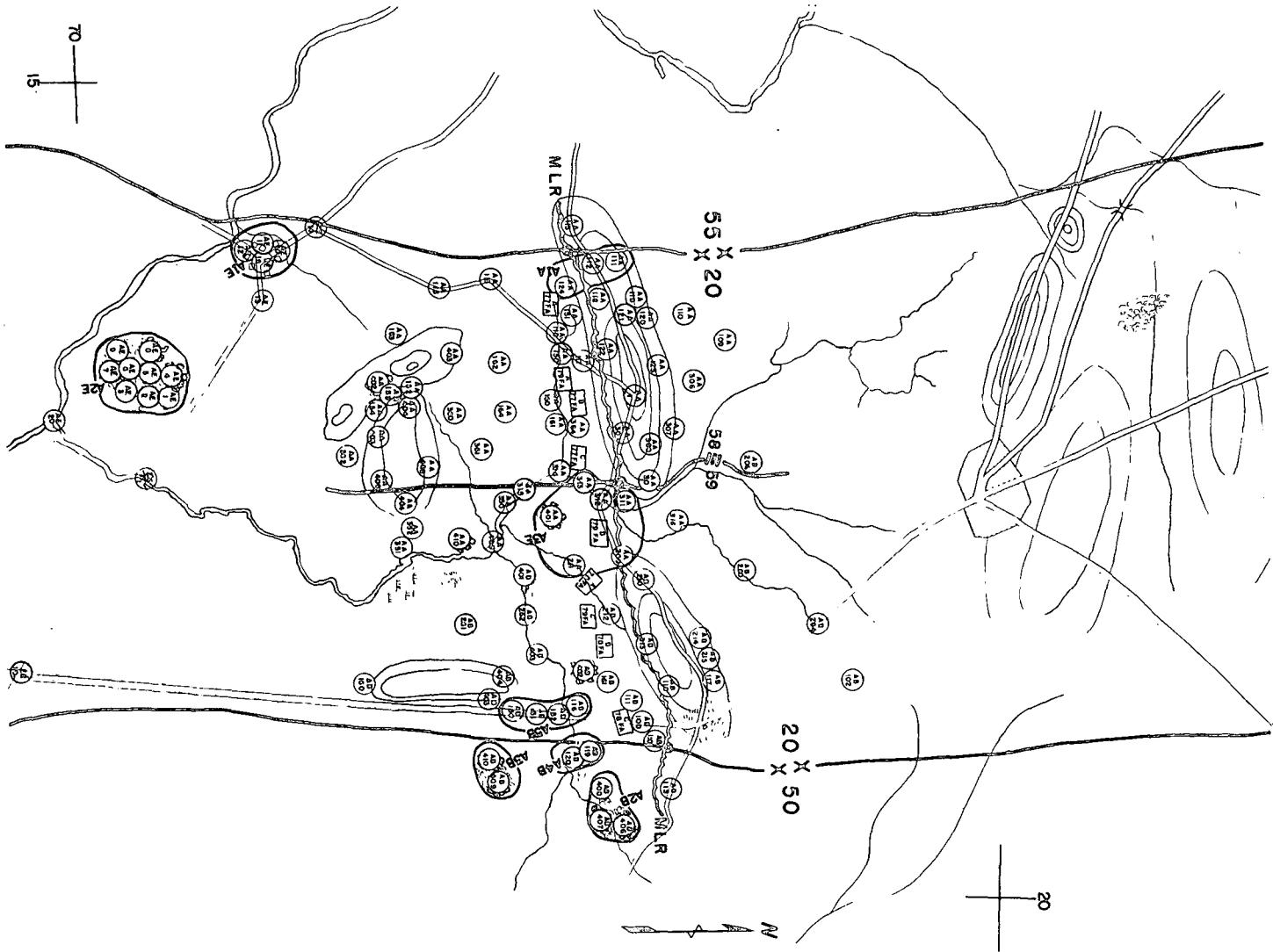
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/s/ Butcher

CLASSIFICATION

DESCRIPTION OF CONCENTRATIONS

No.	Description	Grid Reference	Alt. (yds.)	Remarks
A 77th FA	Barriers	28395800	128	
B 77th FA	Barriers	28395820	128	
C 77th FA	Barriers	28395855	122	
A 76th FA	Barriers	28395812	118	
B 76th FA	Barriers	28610257	120	
C 76th FA	Barriers	30390235	123	
A 78th FA	Barriers	30610205	123	
B 78th FA	Barriers	31490390	130	
C 78th FA	Barriers	31790615	130	



No.	Description	Grid Reference	Alt. (yds.)	Remarks
A1160	Suspect Upn	26695666	121	
A1161	" "	27100000	120	
A1162	Check Conc	26559842	120	Ref height 1115 ft. or burst 2500 ft.
A1163	Suspect CP	27095640	129	For night illumina- tion. Height of burst 2500 ft.
A1164	Check Conc	27359905	129	
A1165	Emplacements	27819830	123	
A1166	" "	28289835	119	
A1167	Suspect Army area	28505674	130	FM reprt
A1168	CP	33319520	130	
A1169	Protective fire	31130326	121	

Note 1: A barrage is planned for each light battery.

Note 2: These fires have been closely coordinated with
infantry fires and defence plans and with
engineer barriers.

Figure 39.

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